

COMPUTER WEEKLY

Vol. 23 No. 588
Thursday, September 22, 1977

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Published weekly on Thursday
Registered at the Post Office as a
newspaper. Price per copy 18p
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Subscriptions for readers outside the above categories are as follows: One year, UK and overseas £14.50, US and Canada \$37.70. Students, UK and Overseas £7.30, US and Canada \$18.90. Airmail rates on request. Subscriptions requests should be sent to: IPC Business Press (Sales & Distribution) Ltd, Oakfield House, Parrymores Road, Heyward Heath, Sussex RH16 3DH. Tel: 0444 89188.

Circulation inquiries: Applications for readership, subscriptions and changes of address are dealt with at the addresses listed above. To ensure regular delivery of Computer Weekly readers who wish the paper to be sent to a new address should send full details (including a wrapper label bearing the serial number to the appropriate department).

Back numbers can be had so available, for 40p post free.

Circulation: 76,665 with the highest fully requested circulation in the UK. International Edition (10 issues a year) circulation 93,219 (UK 76,061; int. 18,158).

ISSN 0010-4787

COMPUTERVIEW

Unemployment death by a thousand cuts

COMPUTER technology is contributing to unemployment levels and will continue to do so at an increasing rate. The only real question now is how advanced industrial societies will cope with the effects of the ability to produce more wealth using less labour.

That might seem like an alarmist statement, unjustified by any concrete evidence. And to some extent it is just that.

It is meant to be alarmist because, like any alarm systems, it is meant to help stimulate action that will help stave off some impending unwelcome act.

It is not backed by any comprehensive research study into the effects of information technology developments on employment levels, because Computer Weekly knows of no such comprehensive survey.

But we are aware, day in and day out, of computer systems that are being implemented which either eliminate existing jobs or reduce the number of jobs in the future.

However, few companies like to announce, "Our computer has saved us x staff" because there is a fear of what the union reaction might be.

It is a case of a creeping death of a thousand small cuts.

In the Observer recently, the distinguished financial columnist C. Gordon Tether examined the problems of the impact of new technologies on employment levels in an article headed "Ideas that put the world out of work".

Tether questions the remark made in a speech by Lord Houghton, former chairman of the Parliamentary Labour Party, suggesting that the answer to

the unemployment problem lay in "boosting industry and technology by all possible means".

Pointing out that most governments now recognise that the steep rise in unemployment in the 1970s is due to "structural changes" beyond the transitory effects of waxing and waning business cycles, Tether comments:

"There is increasing awareness that, foremost among the factors that have led to this structural disequilibrium is the pace of technological advance—more particularly the evolution of machinery capable of producing the same output as that which it replaces with many fewer workers."

This was one of the crucial points raised at the Hedsor Park conference earlier this year, on the theme Can Computers Save Britain? (CW, July 14).

Being logged in the non-glamorous activity league, cleaning seldom receives the due care and attention of computer management.

Establishing good cleaning relations is difficult. Few members of DP management are around when the work is done (or perhaps not done).

So the news that an organisation known as The National Computer Complex Cleaning Committee (CW, September 15) is running a cleaning workshop

next month, could well be the dramatic breakthrough the industry has been awaiting. Although this particular seminar is designed specifically for those managers who have on overall responsibility for cleaning and those who actually do the job, it is open to all with an interest in installation cleaning.

Clearly the opportunity of meeting those responsible for cleaning activities should not be missed.

DP professionals could take the opportunity of mentioning the inadvisability of scrubbing down the disc drives with soapy detergent. Rubbing down the CPU with abrasive cleaners similarly is unhelpful. Using disc-packs as door-stops while the suction cleaner is in operation also needs discouraging.

The facts of DP cleaning life are often staggering. Contract cleaners, possibly hired by the hour, make a determined assault on the installation floor. As a result, not only does the computer room trolley become unmanageable, but the operations manager staggers on the highly-polished floor; or the cleaning team regards the equipment as a lethal adjunct to a reptile house.

The end of the paper roll, still hanging by a thread to the platen, was a chewed-up mess and, as his eye took in the pink edge of the paper, he realised with a sinking feeling that he had left the teletype with an almost empty roll on which to print his night's work.

Moral: He that lends his computer wings, must still attend to little things.

Submitted by John Davidson of Graphic Display Systems, Cambridge, who receives the weekly £5 interrupt prize.

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Ten years ago...

COMPUTER WEEKLY
SEPTEMBER 21, 1967

The Minister of Technology, Anthony Wedgwood Benn, is sending a message of good wishes to a new government centre in Park Avenue, New York, commented the brain drain. "I am sure that the continuing success of the 'talented people'... annual report, the 103rd that proliferation of bodies would hinder the help the training of personnel... The final statement budgeted for 1968, about £10.5 million for Plan Calculi, to run computer plan. CII was 58% of this... ICT had a licence to build a new terminal market with 100 based on the built-up counting machine, the 100 TVC 260 CRT unit, and 40 serial printer.

Two firsts for Chess 4.6

COMPUTER chess scored two notable firsts at the Aronson Chess Congress at Harrow last weekend, billed as Europe's largest. The open entry of 164 players included the first appearance of a computer contestant in any European congress of this type. In addition, in an informal two-game match of five-minute chess at the end of the proceedings, Britain's Michael Steen became the first international Grandmaster to drop a game to a machine in blitz chess.

The first prize for the Open was shared by the Czech Grandmaster Hort and the young British player Peter Large, each with 8½ points. The computer program Chess 4.6 lost one game, won two and drew three, accumulating a final score of 3½ points.

The sole defeat occurred in the first round at the hands of Len Perry, a player rated considerably weaker than chess 4.6 which enjoys "expert" status. The upset was instructive. On move 13 the program launched an ingenious four-move combination which snatched a pawn, but paid the price of having its menacing knight permanently immobilised in a far corner. The program does not have the concept "temporarily safe but trapped" in its repertoire.

A contributing factor in Chess 4.6's success was the psychological effect, even on strong players, of facing a machine for the first time. Chess 4.6's third-round opponent T. Lewin, who once played first board for Oxford, was startled by the program's habit of calculating during its opponent's thinking time so as to concoct a reply to the humer's predicted move, ready for instant release.

"It's very unnerving," he commented afterwards.

Chess 4.6 is the reigning world champion in computer-against-computer chess. It was developed by Larry Atkin and David Sleser at Northwestern University, US.

DONALD MICHIE
● Chess 4.6, page 4.

Fresh attack on ICL's levy policy

THE ICL levy and marketing policies have come under further attack. Complaints have been sent to the Office of Fair Trading by the Central Computer Agency, the office through which all Government computer equipment is ordered, and by plug-compatible systems house, Teknos Systems of Uckfield, Sussex.

Teknos has introduced two disc subsystems which are aimed at ICL 1900 users put off by the cost and performance of the EDS 200 (CW, September 8). The systems, DSS 82 and DSS 84, are said to provide two and four logical EDS 80 drives per spindle respectively, at 50% less than the ICL equivalent.

The Teknos complaint to the OFT is about ICL's compensatory levy which is demanded from users installing add-on memory or peripherals from an independent supplier — or OEM attachments as ICL calls them. The levy is normally 20% of the monthly rental ICL would have received if the user had chosen ICL kit.

The CCA has complained to the OFT about the levy policy, mainly because it can affect ICL government users as well as private concerns.

Several users have challenged ICL's levy policy, including Bradford Metropolitan Council and Norwich Union (CW, June 2), but the CCA and Teknos are the first to take the matter to the OFT. However, the office is already dealing with complaints about servicing policy (CW, June 23).

In the first full issue of the ICL

PO asked to take over all private maintenance

A SETTLEMENT involving the Post Office taking over maintenance of privately-acquired data equipment such as modems and teleprinters is being sought in the dispute initiated by members of the London City Engineering Union.

Branch members are refusing to connect privately-acquired equipment to Post Office lines (CW, September 15). The immediate impasse is being resolved by the Post Office buying the equipment involved and taking over maintenance, but the union is seeking a permanent change in the rules.

'Why I like Insac ideas'

From front page ideas. In his prolonged talks with these companies, they had put forward "some very good ideas, which will prove highly saleable in the US."

"Contrary to another popular opinion," he added, "UK people are prepared to work hard, and UK programmers really know

how to write good software".

Joffe does not, however, see a large volume of sales as Insac's only benefit. "Our first task is to establish credibility. Once we have shown ourselves to be a credible organisation with good backing, people will talk to us freely, and this could result in more front-line technology being brought into the UK."

The aim is to find out how many users feel they are adversely affected by the policy and in what ways, and what the implications are for the future.

The results will probably be given to ICL for its comments and could result in the user conference on the subject, originally planned for this month (CW, July 21), being held in the New Year.

The DSS 82 and DSS 84 plug compatible disc subsystems from Teknos use Calcomp drives which are normally used as IBM 3330 compatible units with 100 or 200 Megabytes per spindle. The Teknos systems reformat each spindle to look like two or four EDS 80s, with overall capacities of 120 or 240 Megabytes.

They are linked to an ICL 1900 via a controller based on the Digico Micro 18E microcomputer and are fully supported by standard ICL EDS 80 executive and operational software.

Teknos says that the DSS 82 and DSS 84 provide reductions of 33% in latency and 14% in average seek time over the EDS 80, although write operations can be slower, depending on the number of logical records to be written.

A spokesman for Case said that the company would be happy to have the Post Office take over maintenance, adding that the company was in business to sell equipment and made little money in maintenance. No one at Racal Milgo was available for comment.

"A meeting between the POEU, the London Branch and the Post Office will be held on October 14 to try to resolve the problem," a union spokesman told Computer Weekly. "We believe the suppliers would probably welcome the Post Office taking over maintenance."

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The systems come with two spindles per cabinet and Teknos quotes £59,000 for a complete DSS 84 system with a controller and two spindles holding a total of 480 Megabytes.

AN integral microprocessor enables the Model 101 portable instrumentation tape recorder announced by Honeywell to be calibrated without expensive external test equipment.

Honeywell says that the

microprocessor also enables the user to verify calibrations and to program specific sections of the tape for replay. It also allows the sequence of tape tracks used to be programmed.

Supplied by the Honeywell

Test Instruments Division, the Model 101 is a large reel unit providing from seven to 32 recording tracks.

Honeywell says it is the first portable instrumentation tape recorder controlled by a micro-

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TELETYPE-compatible Vital VDUs from ATS Communications of Heywards Heath are being installed in place of teletypewriters throughout the BBC's internal communications network and a BBC sub-editor is pictured here dictating a news bulletin to a teletype operator. More than 100 of the VDUs, worth £280,000 in total, are to be installed. The displays will be used for assembly of news bulletins, Press announcements and programme schedules for the regions. The BBC's message switching systems include an ITT 8400 ADX system for the overseas service, and a system from Unit Automation of Tarentum, Kent, based on a Digital Equipment PDP-8/L mini (CW, October 28, 1976).

Micro-controlled tape recorder launched

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GEC policy on union recognition

A MAJORITY decision by employees on whether to be represented by a particular trade union will be recognised by GEC, said Lord Nelson, chairman of the company, at the annual meeting of GEC.

He was replying to a question from John Sampson, general secretary of the United Kingdom Association of Professional Engineers.

"This follows limited recruitment of professional engineers at GEC, following management statements that UKAPE cannot and will not be recognised."

"This misunderstanding has now been cleared up by the very steamlake and honourable declaration of policy by Lord Nelson," said Sampson.

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Guaranteeing program maintainability



DO you know how to write a systems specification, or a contract guarantee which will help you be sure that the resulting programs are really easy to modify and understand once they have gone into the operational phase?

Some people fool themselves that they know how. They write specifications like "Standard Cobol," "Structured Programming" and "Small Modules." Probably these things do contribute to a certain degree to ease of program maintenance. But they do not guarantee any known level of maintainability.

The system can be delivered to the software house or your own people, it can formally meet your specifications, and it can be much more difficult for your maintenance programmers to find their way around it than you had hoped.

What we need is a way of motivating the program producer, and the program designer, to create a specific level of ease of understanding the program. From our point of view, it should not really matter how this is achieved, the important thing is that it is achieved.

There are many different techniques for increasing the maintainability of a program, and a lot of them are much more effective than the three

techniques mentioned above. We should not therefore limit our suppliers by constraining them to a specific set of techniques, because we then become the ones responsible for lack of sufficient maintainability.

Let's learn to judge by results, not by techniques. The practical technique which we use to measure a degree of maintainability is called the "bebugging" technique. Various other terms are used such as artificial bug insertion, which is close to the concept of artificial insemination.

This technique has been used extensively by researchers such as Gould and Drongowski of IBM, to study debugging behaviour. It measures the effect of various people and various program documentation levels on the work of identifying bugs.

Learning from these experiments I have for the past two years made use of the following system and contract specification in a variety of applications:

The program maintainability shall be at least 90 per cent probability (in 1/4 hour) for the assigned and trained maintenance programmer to identify (without fixing and retesting) undesirable program results ("bugs"). A practical test for system acceptance may be

carried out by insertion of at least ten artificial program bugs at random by an independent party, one at a time. The qualified maintenance programmer must demonstrate that they can correctly identify the statements causing the bug in at least nine out of ten cases within a time limit of under one half-hour ("each," or "on average," depending on how lenient you are feeling that day).

In one case, a Scandinavian bank online system, the contracts were already written, and the only specification for the supplier of the 180 intelligent cashier machines, and their programs to be supplied, was that the bank's people "should be able to maintain the programs."

We got agreement immediately from the supplier to an acceptance test based on the above formulation. At first he was sceptical, until I pointed out that such a formulation actually limited his responsibility to the bank. His other objection was, "How can I know if my programmers are making high enough quality programs until it is all finished?" To which the reply was: perform the test on the first module (of 200 planned). If you pass it, you are on the right track; if not, you have an opportunity to change your programming methods and documentation methods.

SOFTWARE FILE

Multi-threading extends Cortez

A RADICALLY new version of one of the major contenders in the competitive ICL transaction processing market has been released. The enhancements to Zeus-Hermes' Cortez TP monitor demonstrate the continual increase of TP sophistication among small-scale ICL users.

The major enhancement to Cortez is the introduction of multi-threading, the capability of processing more than one transaction simultaneously. In many installations, this is likely to improve performance considerably, since relatively fast transactions will not be held up by slower work.

The ICL 2903 series TP monitors, ETS and MTS, do not employ multi-threading, adopting an entirely different philosophy for running user program modules in a TP environment. The main independent competitor for Cortez, the Telecomputing TPS, already has a multi-threading capability.

Other enhancements incor-

porated into Cortez Plus include file security to prevent corruption when more than one user attempts to update the same file. Individual user sets of records or an entire file may be "locked" against access.

Promised interfaces to ICL 7502 and other host terminals have been provided. "device independent" handling facility will allow hard-copy printers to be attached, using the same interface as the visual display terminals.

Although Cortez was originally an Australian product, enhancements implemented by Cortez Plus have been entirely in the UK. Zeus-Hermes could thus find itself in a advantageous position of originator, Spectrum Sales of Melbourne. Details of the enhancements from here have begun, said a Zeus-Hermes spokesman.

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Other enhancements incor-

EDITED BY STEPHEN BELL

Integrating mass with disc storage

SOFTWARE has been announced by IBM in the US to integrate its 3850 mass storage system with disc-based storage.

Known as Hierarchical Storage Manager, it automatically moves datasets to discs or cheaper, slower 3850 storage, dependent on frequency of access.

The product also provides automatic back-up copies of datasets, which are changed whenever the datasets are altered.

The product is not available yet — release is scheduled for early next year — but reaction of potential US users who have examined the specifications appears broadly favourable.

Users of the 3850 have previously had to provide data transfer and back-up manually, and the new software fulfils a widely felt need, it was acknowledged.

Hierarchical Storage Manager is designed to run under MVS and JES3, on all 870s from the 145 upwards. The software is available for the 3850, IBM confirmed. It is designed to service both batch and online users.

ANSI specification boost for Mumps

THE biggest boost to date for the interactive language Mumps was received last week, with the announcement that specifications for an ANSI standard for the language have been accepted by ANSI's DP committee, X3.

The Mumps ANSI standard was first contemplated almost exactly a year ago (CW, September 23, 1976). Final approval gives this relatively new, user-developed language a status so far achieved only by the "industry standard" languages such as Cobol, Fortran and Basic.

Mumps is designed for complex data handling in an interactive mode, and incorporates its own data management software and multi-user executive.

It was originally devised by Massachusetts General Hospital for medical information retrieval and this has remained its predominant use in the US.

In Europe, however, the language has gained a number of commercial users in varying fields, prominent installations being at ATV and Pye Records.

Its popularity was undoubtedly due mainly to its adoption by Digital Equipment, for use on the PDP-11 series. This hardware, for which Massachusetts Hospital originally designed Mumps, still accounts for the overwhelming majority of Mumps installations.

The move towards standardisation was encouraged by the beginning of Mumps implementation on other machines. Acceptance of such a standard by an internationally recognised body will doubtless further accelerate the spread of reliable implementations on to a variety of hardware.

The announcement coincided with the second European Mumps user group meeting (CW September 1). A number of non-DEC implementations of Mumps, particularly on microprocessors, were presented to the meeting.

At a meeting earlier this month, in the US, a timely announcement of a planned implementation came from Prime. A spokesman for the company said that Mumps was not a standard product on Prime's minicomputers yet, but the company "will almost certainly offer Mumps" in the near future, probably by the end of this year.

ANSI standardisation and the prospect of use of Mumps on a wider range of equipment has been, in general, well received

Simulating queueing

A SOFTWARE product allowing simulation of queueing systems without having to learn a specialist language has been adopted by the London University Computing Services bureau. Originally developed at Imperial College, London, under the name Draft, it has been re-named LUCSIM in the LUCS implementation.

LUCSIM accepts a logical and numerical description of the

queueing system to be simulated, and generates from this a Fortran program to perform the simulation.

Constraints on the input mean that this program will be simple in structure, but it is intended merely as a draft, to be elaborated by a Fortran programmer. The effort involved, LUCS claimed, was still a fraction of that entailed by writing a program from scratch.

PROGRAMMER NOTES

DESPITE some doubts expressed by an IBM survey (Programmer Notes, July 21) it is still generally accepted that most programs are long-lived, and maintenance consumes a large proportion of the total programming effort, perhaps more than development in some cases.

In spite of the importance of the maintenance function, said one prominent software developer, maintenance was usually a boring occupation, and, in many installations, was handed over to the least competent programmers.

Why was this, he wondered? Was there still an inadequate appreciation of the importance and complexity of maintenance — or, to look at it negatively, of the wrecking potential of bad maintenance?

Alternatively, is there an element of reward and punishment in the apportioning of work — the good programmers get to do the interesting development jobs, while the

The benefits of doing some maintenance

weaker ones are "sentenced" to a period at the maintenance desk?

Far from being a punishment, our contributor suggested, maintenance work could provide valuable training, increase programmer's awareness of the bad practices which create later maintenance problems, and thus make him or her a better development programmer.

He suggested that not only could programmers spend part of their initial training period in supervised maintenance work, but that trained programmers could benefit from having their jobs "rotated" between development and maintenance programming.

How is development and maintenance work partitioned at your installation? Is there an established team of "maintenance programmers"? Does everyone maintain his or her

own programs, creating the risk of unclear code written for one programmer's eyes only? Or are job functions freely rotated? Whatever technique is employed, do you think it is the best, or could it be improved?

Is there any way of reducing the maintenance load or, alternatively, of making maintenance work more interesting? Our correspondent, a marketer of packages, naturally suggests that the maintenance load can frequently be eliminated by buying a package. It would be interesting to see whether this is true in practice.

Does the "not invented here" syndrome allow DP managers to leave their packages alone, or are unfortunate programmers called on to maintain, or drastically amend, software acquired from outside?

Puzzler

3	2	1
4	5	6
A	B	C

THIS diagram represents six counters stacked on three bases A, B and C. So the position left-to-right can be described as 3 2 1
4 5 6

The problem is to bring about 1 3 5
2 4 6

left-to-right position in only 15 moves.

Each "move" must consist of transferring one uppermost counter to another base — but at no time may any number rest on a lower number than itself.

For example, the first of the 15 moves could be either 2-to-A, 1-to-A or 1-to-B; but 3-to-B, 3-to-C and 2-to-C are not permitted. See page 65 for solution.

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Comshare, Univac in attack on inefficient materials management

LATEST recognition of the importance of efficient materials management to the manufacturing industry has come on two fronts.

Univac's formation of a special UK division for its Unis manufacturing control system has been swiftly followed by the release of a new materials management package, Boss, from the Comshare bureau.

Boss, Comshare claimed, would allow a company which manufactures by assembly or fabrication to calculate its materials requirement and regulate its stock of raw materials or components in the face of varying demand for its product and varying material supply.

The user could, from his own terminal, update stock and order information, inquire into stock status, produce standard and specialised reports, and allocate stock against known orders, said Comshare. Various production plans could also be tested, to judge their effect on stock levels and their efficiency in meeting demand.

Boss already has five users, including engineers Hick Hargreaves and Son, of Bolton, Lancs. The product was developed entirely by Comshare's UK division, initially for the UK

market, but when a user base has been established marketing will extend into the US and Europe.

Together with the software, Comshare is also to provide a consultancy service to aid Boss users.

Univac UK's new division is headed by Mike Sanders (Peo-

ple, September 19), to provide salesmen and staff dedicated to Unis.

Unis is founded on a database for all information handles inventory management, production planning and scheduling and order management. It runs on Univac's Series 1100 systems.

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Trend predictor package

ADDING to the variety of software tools on the market for predicting trends in any kind of data on the basis of past values is the SIA bureau. Known simply as Time Series Data Base, the software allows series of past data values to be stored, retrieved and amended.

SIA already markets a prediction suite known as Sybil/Runer (CW, October 21, 1976), and TSDB has been fully interfaced with this software.

Data can be entered into the TSDB database on punched cards or paper tape, or direct through a terminal. In addition to the time series values, accompanying documentation can also be stored. TSDB was originally developed by Whitehead Consultants, London.

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COMPUTER WEEKLY

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OTHELLO is a game of strategy for two players. It is played with two-sided, black and white counters on a square board. At each move you capture one or more rows of your opponent's pieces by trapping them between your own pieces. The captured pieces are turned over to show your colour. The process switches back and forth throughout the game, and part of the appeal is the potential for dramatic reversals right up to the last move of the game.

Please send me a set of OTHELLO at £3.75 per set. I enclose a cheque/postal order for £ made payable to THE DAVID HANN ORGANISATION.

Send this coupon and your payment to Computer Weekly Othello Offer, The David Hann Organisation, 7, Brighton Road, Bournemouth, Dorset, B15 1LX. Use block capitals — this coupon will be your address label.

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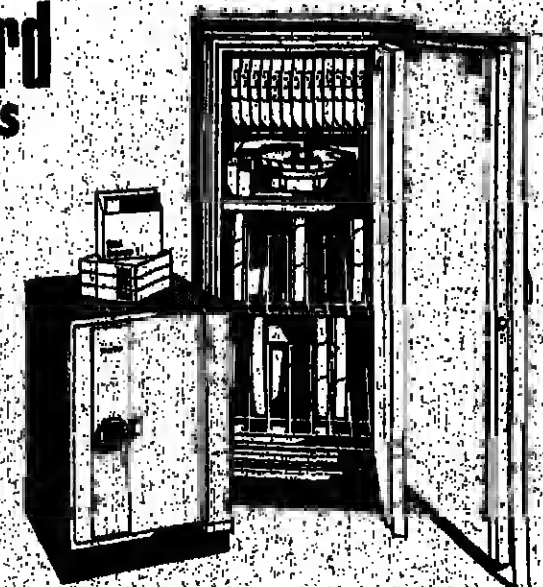
Our new computer firesafes give big protection for even the smallest user

Our range is designed for the mini as well as the maxi user. In fact we make the smallest computer firesafe in Europe, if you need it. All models include protection for word-processing systems.

So just select the safe that suits your requirements. You'll find it fully adaptable for combination storage of mixed media and you know you can rely on its protection properties because it's made to Stratford standards and independently tested.

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Stratford Firesafes



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LETTERS

The guardians of the public interest...

COULD I express my complete support for your Computerview on Professor Dijkstra's outburst on microprocessors?

However, I feel strongly that it is not simply a case of accepting microprocessors because they are here. Surely

Indebted

YOU reported the sad tale of the destruction of our computer installation (CW, September 8). Through your paper I would like to thank the staff of the Wellcome Foundation Dartford and BOC Datasolve who helped us recover our planning systems and get them operating again with minimal interruption.

P.S. BEDINGFIELD
Planning Systems Project Manager
Bowater Scott Corp.

this long-term objective of the true professional is to be a guardian of the public interest until such time as the ordinary man in the street can take over the "technology" as a well understood and accepted part of everyday life.

Microprocessors will clearly contribute more positively to public understanding than any other factor since the invention of the computer and must therefore be given an unequivocal welcome.

Whatever has happened so far in the history of computing, very little has been done to dispel the fear and misunderstanding of the general public and non-computer people produced by the large centralised mainframe, and its accompanying academic gobbledegook.

The microprocessor and the pocket calculator are, thank

goodness, helping to correct this.

To ignore this long-term objective, is simply to establish an elite feared and necessary to survive in the technological jungle, a group of dedicated "witch doctors" full of modern mumbo-jumbo. Professionalism then begins its exploitation of the public, gradually disregarding conscience and standards to degenerate into the cult of the secure job and the good salary, ample protectionism in an insecure world.

Please let computing, the youngest profession, take a different stand even if most of us are no longer needed in the future.

Dr P. J. MARCER
Manager
South West Universities
Computer Network
University of Bristol

Shortage of staff due to lack of training

I WOULD like to comment on the letter from Mr K. Carter (CW, July 28) about the acute shortage of computer people, resulting in the high turnover of staff. The most valid reason for this shortage is lack of training, and while I agree completely with the points Mr Carter so firmly made, it must be said that 100 per cent responsibility for the current situation cannot fairly be placed on the shoulders of the educational institutions alone. A company must have an education and training programme to assist its employees' career development. Obviously to be cost effective this training programme must be co-ordinated to make it responsive both to company requirements as well as individual needs. People with a high need for advancement will leave a company unless this need is fulfilled. Emphasis on advancement, through training, increases the job satisfaction of computer

staff and so encourages them not to take their new found knowledge elsewhere.

The problem is two-stage: Education to industry entry; and education and training for career and technical advancement.

The responsibility for solving it at both stages must be shared by the educational institutions and the industry as a whole. A good case for a Computer Industry Training Board has

existed for many years, so where is it?

I agree with Mr Carter that computer science must be established as a major discipline in our universities but would again emphasise the need for post-graduate education and training in computer technology, if the UK is to meet the demands for competent computer people.

SHARON ROSS
Infotech International

Plenty of literature on CAL systems

IT was interesting to read the comments of NDPCAL's assistant director, Roger Miles, on the availability of published material on computer assisted learning (CAL) systems in the US (CW, August 18). As many of your readers will be aware, there now exists a large number of student orientated computer-based teaching and learning systems in both America and Europe. Of those available within the US, perhaps the most well known are TICCIT (the Time-shared Interactive Computer Controlled Information Television from the Mitre Corporation) and, of course, PLATO from CDC.

I should like to clarify a comment which originated from Mr Miles describing the apparent scantiness of information about non-British CAL effort. The amount of literature available on and relevant to US CAL systems is quite substantial. For example, there are over 400 published reports/papers on the PLATO system alone. The first of these dates back to about April, 1961, while the most recent is probably that entitled, "Demonstration of the PLATO IV Computer Based Education System - Final Report for the Period 1/1/72 through 30/6/76." This latest report (375 pages) was published

in March, 1977, and described PLATO's major achievements and internal evaluation. In addition, several of the many applications are described: the teaching of elementary mathematics, university physics and university chemistry. Some of the published reports deal with the effectiveness of PLATO and the teaching techniques that it uses.

There are many additional reports that describe other CAL systems located in either the US or Europe (for example, those in France and Germany). Given that there exists a wealth of information about CAL, how can NDPCAL claim that "this is very little published material on US systems?" Such an unawareness certainly reflects the need for setting up a national information centre on CAL. Let us hope, however, that the proposed centre will be beyond the horizons of orthodoxy and somewhat inside NDPCAL's organisation. An attempt to broaden the term's reference to such a centre would thus give educators the opportunity of learning more about the progress being made by workers in other countries within this very important area.

P. G. BARRETT
Middlesbrough

Care of equipment

I WOULD agree with all that Mr Richard Evans says in his article (CW, August 25) and would like to support his comments with some of my own. My comments are formed from a hardware engineering background, and I aim them directly at the computer manufacturer, independent service companies, and users. While it is true that the staff of computer users need training in points A B C D with regard to media, they also need training in the care of the equipment that handles that media.

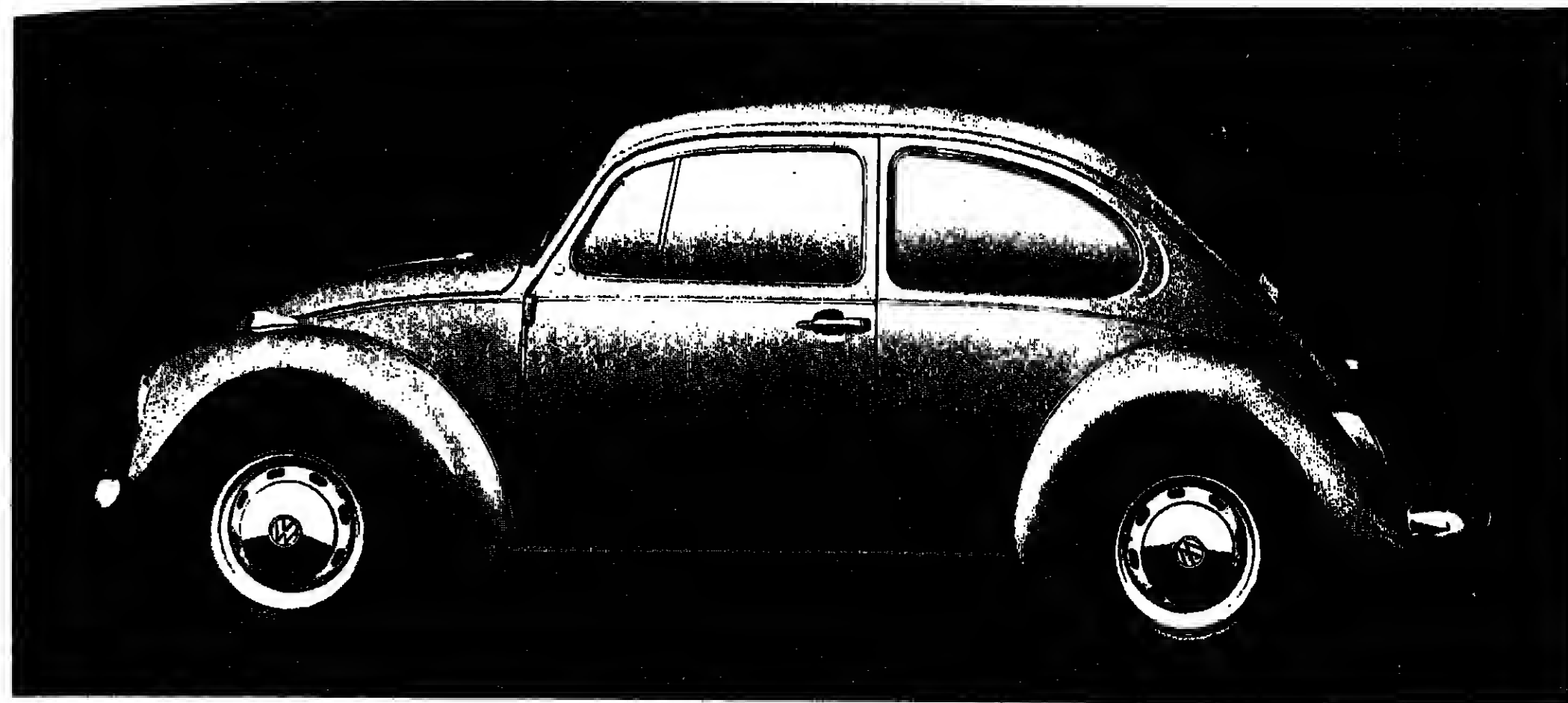
In the time that I have been in the computer industry I have seen great importance placed on what was called operator maintenance. This graduated to daily housekeeping but meant the same thing. It was applied in the data prep area, as well as the computer room. Then as more computer manufacturers started to evolve, and compete for sales, the need for operator maintenance, though still there, was never mentioned.

As long as you have moving mechanical parts, moving stationery, moving magnetic tape, moving discs, the need will remain. Tape drive heads and transport area need to be cleaned, paper dust removed from line printers, card dust from card readers and so on. Ask any operator how many times he cleans the stylus on his video record player, or the head of his cassette player. It's not

that they don't know. I think that some computer users believed, or worse, just wanted to believe, that this maintenance was not necessary merely to gain more online time. In some cases it has just added to the list of daily chores. This may well be other factors that have helped to bring about the general fall in standards in the area over the last ten years.

What needs to be done around the manufacturer, and the independent maintenance company, is to reintroduce operator maintenance as an important part of the daily routine of running a computer system. Both the maintenance of the media, and the maintenance of the hardware. If this were done they would find that not only would the user achieve a higher serviceability "ratio", but the serviceability departments would experience a drop in fault rate. This would improve the service department's efficiency.

It would do well, compared to good if they were to support an engineer to attend to the needs of their product. He should be of their product. He should be able to provide training and to maintain the continuously changing area of field maintenance in line with continuous development of peripherals.



How Nixdorf help to keep the most reliable car in the world on the road.

Imagine for a moment that you're the Data Processing manager of a rather large car manufacturer.

You're trying to keep tabs on a full spares service for those fifteen million or so Beetles trundling around.

At the same time, you're attempting to institute a system that looks after the new models VW are constantly bringing out.

You'll have depots to look after, overseas markets, importers, garages, and service centres. In short you'll have problems.

Problems which will be solved by Nixdorf's 8820 distributed processing system.

For a start, one major way in which Nixdorf's 8820 solves problems is

by not creating them. Even those of the small and nagging variety.

Because if you're like the Volkswagen H.Q. in Germany and have a distributed processing network of around 250 terminals, small nagging problems can soon add up to a twenty-four-hour major headache. Even if you only need a handful of terminals, you still want to avoid problems.

Which is why Volkswagen chose the Nixdorf 8820 distributed processing terminal system.

Quite rightly, the DP manager of Volkswagen knew he'd have enough on his plate without having to worry about hardware or software malfunction. (Let alone what's perhaps the biggest single problem that besets a DP manager. That of reorientating people in existing situations to run and operate the systems.)

Leaving aside for a moment the robustness, reliability and superior processing power of the 8820 we also decided to make it as idiot-proof as possible.

Hence diskettes which are impossible to erase and entry doors which are automatically locked when the machine is in action.

An automatic fault finding mechanism which in the event of the 8820

going down, locates and identifies the problem straight away. (This makes repairs far easier for the service engineer, who, incidentally, will usually be with the machine within 3½ hours.)

And a step by step operator guide which helps the operator to perform all functions correctly, first time round.

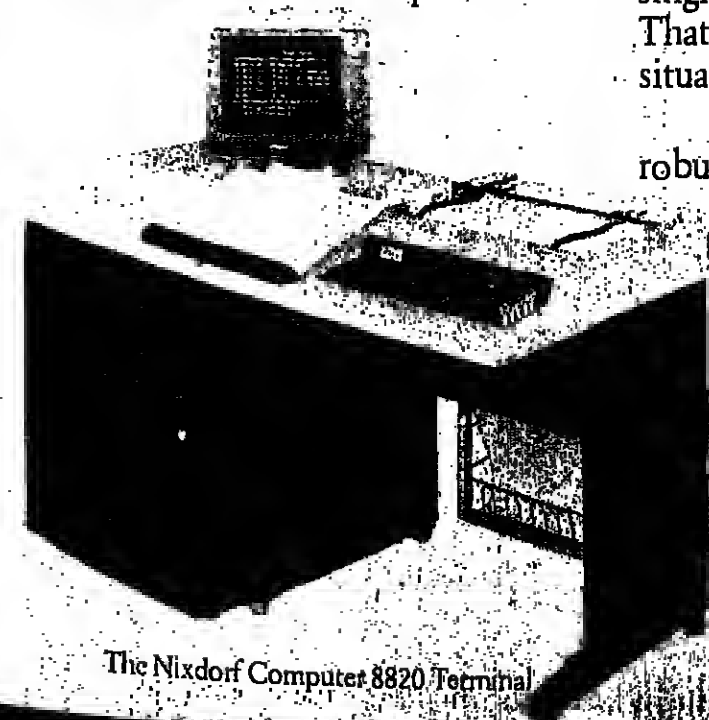
Another factor which could have influenced Volkswagen's DP manager's decision is the fact that the 8820 has, as we hinted earlier, processing power which is double that of the nearest competition within the price range. What's more the 28K core size can be doubled for only £1,300. (Compare that with £3,000 for an extra 16K from the competition.)

We'd like to think, though, that Volkswagen chose Nixdorf's 8820 by looking for a terminal manufacturer who shared their philosophy. That of making and supporting the most reliable, robust machinery on the market.

So, if you'd like to know more about the Nixdorf system that helps to keep the world's most popular car on the road, write to or contact Roger Neill on 01-572 3111.

NIXDORF
COMPUTER

Nixdorf Computer Ltd, Hounslow Centre
Hounslow Road, Hounslow, Middlesex



The Nixdorf Computer 8820 Terminal

You are cordially invited to witness the introduction of Inforex distributed data processing at the Trade Centre 6-7 Oct.~ it's the real thing!

Please send me an INVITATION to the Inforex launch at the U.S. Trade Centre, 6-7 October.

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☐ I will not be able to attend. Please send details.



Intelligent Key Entry Data Management Systems Distributed Data Processing, to be unveiled on 6th October 1977.

Inforex Limited, Inforex House, Headstone Road, Harrow HA1 1PL. Telephone: 01-863 8311. Manchester Office: Sixth Floor, Emerson House, Albert Street, Eccles, Manchester. Telephone: 061-707 1123.

INFOREX
Data Management Systems

Fortronic delivers

FIRST production prototypes of a banking terminal developed by Fortronic for the Clydesdale Bank have now been delivered.

The terminals allow rapid customer and account verification on each transaction.

Clydesdale is planning to install them in all its branches to provide the basis for a distributed data network with centralised inquiry and data collection facilities.

Fortronic has also reached a draft agreement with Computer Industries, Iran, the government-backed terminal manufacturer, for a joint development venture on a terminal that has both Farsi and Roman type.

Paisley upgrades

A PRIME 400 minicomputer with 512K of memory, two 80 Megabyte disc drives and supporting 48 terminals, has been installed at Paisley College of Technology, Strathclyde, at a cost of £60,000. The low price was due to Prime's policy of buying back the first computer its customers install. The college bought a 256K Prime 300 early this year and traded it in for the 400.



A NEW control unit has been introduced by BASF which enables the IBM plug-compatible disc drives to be attached to the small 370/125 mainframe. Called the 6033 control unit, the device, shown here, will handle up to eight drives, including the BASF 6236 100 Megabyte and 6230 200 Megabyte drives. A 6033 controller and 6230 drive are equivalent to an IBM 3333, according to BASF.

Tymshare link Down Under

THE Australian Overseas Telecommunications Commission is considering the installation of a node to allow users throughout Australia to access Tymshare's US packet-switched network. The main attraction to users is likely to be the wide range of databases available on Tymnet, but the mode would

also allow Tymshare to market its service bureau facilities. Following the lead of the UK Post Office, most European FTIs are now offering similar services, allowing users to link to both Tymnet and the US Telenet packet-switched network (Computer Weekly, August 11).

OP SPOT

Following the recent theft of a Ventek System Op Spot considers the increasing possibility of computer systems being stolen... and advises on security precautions.

As systems get smaller, risk of theft grows

SECURITY is a word often heard around computer installations. In the majority of cases it is applied to the safety of the data processing system as a whole, rather than the physical security of the hardware.

Many hundreds of pounds may be spent ensuring that a system is available only to authorised users, by means such as passwords and other security checks. Yet the physical security of the system is often entrusted to a simple magnetic card key access system.

The supervision and operation of this access system is frequently abused; lost keys are often replaced without question, and seldom is the key mechanism changed.

The key access system does perform a basic job in restricting access to the com-

puter area, but it is not the last word in security.

The recent theft of a Ventek system (CW, September 8) shows that physical theft is something we must face as a real possibility. Computer systems are growing smaller in size, and feasibility of stealing a system is growing inversely.

But security should primarily be aimed at ensuring the physical security of storage media, such as discs and tapes. These are the true ways in which a system can be disabled, and magnetic media require protection.

The computer area attracts many visitors, who come as users to deliver and collect input and output, maintenance staff to maintain the system, and ordinary visitors who come simply to look. All these categories of visitors must be controlled.

The system will also attract the attentions of malcontents, who see it as an easy way of inflicting harm on the company. International organisations and companies are particularly prone to this form of attack.

Fire is another danger in the computer room, but this is a problem that can easily be tackled, not only by providing ample fire-fighting equipment, but also by training staff in the efficient use of the equipment. A well disciplined fire-fighting team can pay handsome dividends.

Fire detection equipment should not only be installed in the computer room and adjacent areas, but also in the air-conditioning plant room, stationery store, and in false floors and ceiling voids. An adequate fire detection system is not a luxury, but a necessity. The system should be designed to sound fire alarms in the entire complex, activate an alarm to notify the fire brigade, and automatically activate the extinguishing system in the computer room.

Theft is a problem in many installations. Steps, though not necessarily elaborate, should be taken to ensure that petty pilfering is avoided. This includes the theft of

such items as engineering tools, and smaller items of equipment.

More serious is the theft of confidential data and software. An accurate analysis of the computer log should reveal any abuse of machine time; but the physical aspect of the theft of processing time can more easily be avoided by changing the numbering of shifts at regular intervals.

Prevention is better than cure, and to this end many steps can be taken to increase the security of the system and installation. The security of an installation is drastically increased if the computer is housed in its own purpose-built building, situated away from the main complex. Unauthorised persons would be identified more easily if they attempted to approach the installation during periods of closure.

Illegal methods of access to the building can be restricted by incorporating as few windows as possible. Where windows are installed they should be of toughened or wired glass, and of the "fixed" variety.

Security guards, where employed, should be advised in writing of any computer staff who will require access to the building during evenings, nights or weekends, whether they be workers regular shifts or on overtime. No staff member should be allowed access during these times unless there is written authority with the security guard to this effect. This rule should be inflexible. Additionally, in order not to sow the seeds of familiarity, the security guards should be changed regularly.

A computer is a valuable piece of equipment, and deserves to be treated as such. It should be remembered that it cannot be replaced "off the shelf", and its loss would cause serious disruption throughout the company. Replacement could in many cases take up to 12 months, and even a loss of disc packs or magnetic tapes could cause serious disruption to the company's day-to-day operations.

Puerto Rico buys Honeywell Level 68 Multics system

THE first Honeywell Level 68 Multics system to be sold outside continental US is going to the Puerto Rico Highway Authority. Puerto Rico is the Caribbean island administered by the US, and the Highway Authority needed the special security features for which Multics was designed, because it intends to sell time on the machine to outside users.

As well as being designed to isolate each user completely from all others by the use of

"rings of protection" in its architecture, Multics was designed as an interactive system, and these two features Honeywell the contract for IBM, the resident supplier, and 370/158 is being replaced by 370/158 and Univac.

Most of the Multics software is written in PL/I, and the Highway Authority has little difficulty in translating programs written in other PL/I languages for the IBM PL/I.

Word processing conference

A TWO-DAY conference on word processing aimed at those involved in the growth of information handling systems, is to be held on October 25 and 26, at the Regent Centre Hotel, London.

Under the title "Putting Word Processing into Perspective", the conference, organised by On-line, will look at four points:

1. Accessing to office and business systems management; 2. Control of systems as they grow; 3. Where will word processing and data processing be in the future; 4. Why are prices so high?

MICROPROCESSOR NEWS

Low-cost system to debug Z80 programs

AS the majority of design effort in realising microprocessor-based applications is proving to be in software rather than hardware, Zilog has produced a low-cost Program Development System specifically for debugging and developing software for Z80 systems.

At a cost of £2,100 for a minimum configuration, the system, called the Z80-PDS, generally obviates the need for hardware development effort by utilising its construction boards from the Zilog microcomputer card range. In this way, software developed on the PDS can easily be transferred to the target microprocessor system constructed of boards of the same type.

The basic configuration consists of a single floppy disc drive offering up to 300K bytes, 18K bytes of read/write memory and 3K bytes of PROM. It also includes a serial I/O with RS-232 or atrappable current loop interface.

This can be expanded by a variety of option system modules that include the Z80-108 I/O board, the Z80-SIB serial I/O board, the Z80-VDB video display board and the Z80-PPB PROM programming board. The latter allows a variety of PROM devices to be programmed on the board directly by the system, once the applications software has been developed.

The hardware is packaged in two units consisting of a card enclosure, complete with power supply and space for four cards, and a floppy disc drive.

The software for use on the PDS is the same as used on the Z80 Development System and the Z80 microcomputer family. It includes a disc resident operating system, editor, assembler, debugger, and file handling utilities.

As the system's read/write memory can be expanded up to 32K bytes, Zilog has taken the opportunity to make available two assembler options, one specifically intended for operation on the larger configuration.

Although the Z80-PDS can be operated as a stand-alone system, Zilog foresees a considerable market for it acting as a satellite to the Z80 Development System. Up to four PDSs to one Development System can be operated in this way, reflecting the ratio of compiling power required by software and hardware development work.

The price also reflects the generally lower level of finance available in Europe for microprocessor-based applications development. Much of the initial effort in realising the Z80-PDS came from the company's European operation.

Intel adds to SBC range

A NEW single board computer specifically optimised for use in stand-alone applications such as programmable controllers, remote data gathering and intelligent peripherals, has been added to its SBC OEM range by Intel.

The SBC 80/04 operates from a single 5-volt power supply rail, and is available at a cost of £72 in quantities of 100 units.

The heart of the board is an Intel 8085 8-bit microprocessor. A read/write memory of 256 bytes is provided in static RAM, and the board also includes 22 programmable parallel I/O lines,

serial I/O lines with TTL line drivers and receivers offering provision for CCITT V24 transmission, a 14-bit programmable interval timer and a four-level vectored priority interrupt system.

Sockets are also provided for up to 4K bytes of non-volatile program storage and the line drivers and receivers that are user selectable to configure the parallel I/O to suit particular applications. The parallel I/O lines are brought out to an edge connector that can be mated with ribbon, woven or round cables. The serial I/O can also be accessed from this connector.

Comart widens its service

MICROCOMPUTER mail order and retail specialist, Comart, is widening its service capability with the provision of a hardware and software consultancy.

Operated by the company mainly by freelance specialists, the service will provide a kitbuilding facility, together with advice on hardware, and a

fault correction and debugging service for both hardware and software.

Comart is also releasing a catalogue covering \$100 bus-compatible products from Cromeco, North Star, Dynabyte, Franklin Electric Corp and IMSAI, for which it is a UK representative.

MicroSim addition

AN addition to Pactal's MicroSim enables users to relate microprocessor simulations to real time.

Known as MicroSim 8080, the program is an inter-assembler that combines the ease of use of an interpretive approach, with the efficiency of a true assembler. It has been developed jointly by Pactal and D. M. England and Partners, both Intel consultants.

Object of the new program is to overcome the main shortcoming of most cross compilers — that they give the programmer no indication of execution

times on the eventual target microprocessor system. The program incorporates a "clock" register which can be examined at any time during or after a simulation run. This will show the exact count of target machine cycles. Alternatively, the clock can be set to a negative value representing the time available for a program. The simulation will halt with a message when the time has elapsed.

The program is available on a dial-up time shared basis from Allen Computer Services, or for installation on the user's own computer.

Double density diskette system

AS part of its Intellex 888 microcomputer development centre, Intel has introduced a double density diskette system that can operate with Intel development systems as a stand-alone item.

Designated the MDS-DDS, the diskette system utilises a soft-sectored format for data addressing. This allows up to half a million bytes to be stored on each disc, in up to 200 separate files.

Micro-based unit replaces TA 10

THE low-cost Triumph Adler TA 10 office computer of the UK distributor of its typewriters and other office products and negotiations are taking place between OEM and TA that could lead to OEM taking a share in Adler Business Systems.

The TA 20 Compact will come with an Intel 8080, 8K RAM and a 7-12K ROM, a 132-column printer with a golf ball — single element as TA prefers to call it — print head, and a cassette unit will be an option. It will be about the same size as a large typewriter.

Bigger TA 20 models can be supplied with matrix printers and magnetic ledger card units and cost up to £10,000. The more powerful TA 1000, of which about 400 are now installed in the UK, starts at £12,000 and can be supplied with floppy disc or hard disc storage.

However, OEM will retain a very close relationship with

will cover the Z80, Z80A, their peripheral family, and associated static and dynamic memory system design.

The course, to be held on October 6 and at the company's London headquarters, is limited in numbers.

Mostek design workshop

A TWO-DAY microprocessor design workshop, to be held by Mostek UK next month, will provide instruction in the hardware and software aspects of the Z80 system.

Aimed primarily at engineers with little or no experience of micro-computing, the workshop

will cover the Z80, Z80A, their peripheral family, and associated static and dynamic memory system design.

The course, to be held on October 6 and at the company's London headquarters, is limited in numbers.

Most people already have a Reality user's manual



Reality understands English. So the obvious place to find the right words for Reality is an English dictionary. Choose the most useful words: - check, sort, list, control, inventory, value, together with those particularly associated with your type of business. It's as simple as that.

Reality is a computer-based data management system which stores centrally all data required for an operation (business, factory, warehouse, accounts department) and allows anyone interested — not just data processing professionals — to access and update files whenever necessary using an easy to operate TV-type screen or printer.

What's more Reality can be used wherever the work is being done. And as many enquiries can be made simultaneously as there are terminals on the system — providing the security password is tapped in first.

If you can speak English then Reality will answer back

However, Reality understands more than just English. For the EDP specialist it copes with high level application-oriented languages such as DATA/BASIC or RPG11.

And there is the useful PROC — a job control language which enables a whole series of operations to be originated with a single command.

Sales Order Entry, Stock Control, Accounting, Production Scheduling, Inventory, Sales Records, Payroll, Credit Control, Reality can look after all these business manœuvres and many, many, more.

If you're interested in saving cost and increasing efficiency then fill in the coupon telex or phone: 0442 61 266 Ext 202 for more information and an opportunity to see Reality in action.

Please send for my attention, more information on the Reality business system. I would like to see a representative. I would like a demonstration at my office. /Nearest CMC Office

Name _____ Position _____ Company _____ Address _____

Communications Manager, Computer Machinery Company Limited, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200.

REALITY CMC

Rummaging through the records from which we first started publishing excerpts in the form of the *Liveware File* on January 1, 1970,

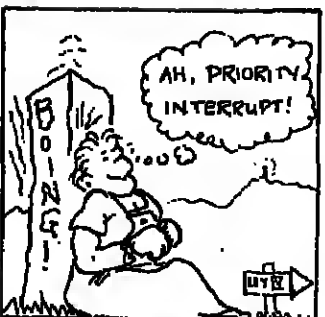
The Liveware Saga

by Don

THE RECORDS REVEALED THAT THE LARGE STONE RINGS, OR HENGES, DOTTED OVER BRITAIN ONCE FORMED PART OF A NETWORK PROCESSING NETWORK...

...RUN BY A DPM (DRUID PROCESSING MASTER) CALLED ARTHURUS, BASED AT STONEHENGE...

...THROUGHOUT THE LAND WERE VERY REMOTE TERMINALS...
...CONNECTED BY LEY-LINES, OR MYSTIC DATA-LINKS...



MESSAGE FROM AVEBURY VIA BLETCHLEY...

"BEWARE THE FURY OF THE NORTHMEN!"

VERY ENIGMATIC!

NEXT WEEK WHY THE NORTHMEN WERE FURIOUS!

PEOPLE

New German office for Racal-Redac

RACAL-REDAC of Tewkesbury, Gloucestershire has opened a new sales office at Bannberg, near Cologne in West Germany. It would serve a large area of North Germany to meet a growing demand in the field of computer aided design systems.

Racal-Redac already has its headquarters in Munich, established nine months ago for the company's printed circuit board design systems. The Bannberg office will be run by John Babbington as sales manager in charge of the office.

Elected a member of the council of the Institute of Statisticians, is Barry Quirk, managing director of the CRC Group. Last year he became a Fellow of the Institute, of which he has been a member since

Alan Savage, now product manager of Extel's computer products group, was previously with CASE as a sales engineer; Alan Marko, who has become sales engineer, impact printers with Extel, was formerly a sales engineer with PKS Designs.



Staines Miller

Tom Valentine, latterly chief accountant at Backman Instruments, has become financial controller.

Wright Air Conditioning Ltd of Birmingham, has appointed Russell Miller as a senior development engineer to deal specifically with the development of new products. He was previously a project engineer with Stone-Plett Crawley Ltd of Sussex.

Roy Staines, formerly a project manager in management services division of C and A Modes has been retained by Compute (Bridgend) Ltd as a marketing representative for all CBL software.

Gordon Strickland has been appointed as manager, systems and marketing support by Sweda International (UK). He was formerly with NCR as a retail systems support manager.

Francis Rowe has become director of systems marketing programs for Data General in the US. He was formerly head of special marketing projects and director of product marketing. Lawrence Saltman becomes director of small business systems development; formerly he was head of the systems products organisation, which becomes part of



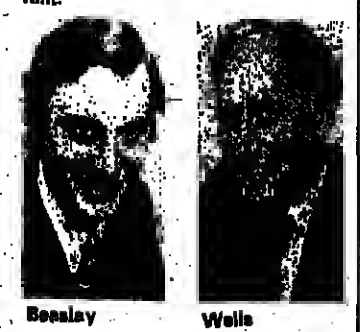
J. Woch

IT'S tough at the top... a move by David Finin (right) a computer operations shift leader from Newcastle, is watched closely by operators at the final of the British Othello Championship held in London earlier this month.

Finin was beaten by two games to one in the final match by the new British champion, Joseph Woch, a representative for a pharmaceutical firm. Woch goes on to play in the World Championship in Tokyo next month.

Computer Weekly Othello offer: see page 8.

Wally Wells, who has been with Datasab UK for the past three years, has been appointed deputy managing director of the company. He had been manager of the Southern division of Datasab for some time.



Beasley Wells

BIS Applied Systems Ltd has promoted two of its employees to principal consultants. Howard Beale was previously a senior consultant and Paul Green was a project manager. Another appointment announced is that of Ray Beasley, previously software team leader with Automobile Association at Basingstoke, as an associate consultant.

Bob Mall has been appointed director, finance and administration with Honeywell Information Systems UK, effective October 18. He succeeds Dick Veral who returns to the Stetas as vice-president, finance and administration. Mall was previously director, financial planning and analysis in Honeywell's systems management office in Min-

punch girl Bella made a startling discovery which adds another dimension to the concept of time sharing...

DIARY

SEPTEMBER 28-29 Distributed computer control systems - International conference. IEE, Birmingham.

SEPTEMBER 27 Distributed intelligence seminar. BCS, Café Royal, London W1. 8.30. Computer fraud. J. M. Ross, BCS, Birmingham branch. Priory Dane Hotel, Edgbaston, Birmingham, 18.30.

SEPTEMBER 28-29 The main machine interface. Mike Cowley, BCS, 5 Woles branch. Central Hotel, Cardiff, 18.30.

Notes: BCS Natural Language Translation Specialist Group meeting has been cancelled.

SEPTEMBER 27-28 Morning. IBM Computer Users' Association System 3 Group. White House Hotel, London.

SEPTEMBER 27-30 Annual conference. Operation Research Society. The Queen's and Margaret College, University of Oxford.

SEPTEMBER 28 Computer access to large databases using alternative store technologies. Ken Groves, Patat Waterworth, Roy Brierley, BCS Information Retrieval Specialist Group. City University, London, 14.00. Tickets £1 from Pauline Walters, at the BCS, tel: 01-437 0471.

The projection of data by cryptography. seminar. NCC/NPL, Cumberland Hotel, London W2. 10.00.

SEPTEMBER 28-29 Meeting. IBM Computer Users' Association Local Authorities Group. Hampshire County Council, The Castle, Winchester.

SEPTEMBER 28 Annual dinner. G. A. Fisher, guest of honour. BCS Advanced Programming Specialist Group. Tickets £8.00 from Prof. P. J. H. King, 10 Gower Street, London WC1. 19.30.

PL/I in a CMS environment. Tony Smith. BCS PL/I Specialist Group. LSE, London WC2. 17.30.

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OCTOBER 4 CEGB computing present at BCS, Kent branch. St George's, Chatham, 18.30.

Introduction to the Waterbury Historical view of process development. Peter Ford, Dr R. E. Jones, Nottingham branch. T. H. Theatre, University of Nottingham.

The microcomputer and its commercial use. Martin Hogg, City of Birmingham, 14.30.

OCTOBER 4 Datafair 77, the end user conference. BCS, Connaught Hotel, London W8. Debut Debut, tel: 01-242 2481.

OCTOBER 1 The new ANS Fortran subset: growth of preprocessors. K. J. Specialist Group. Connaught Hotel, London W8. 18.30.

PL/I, what's in it for you? C. L. Barker et al. BCS PL/I Specialist Group. Connaught International Hotel, London W8. 18.00.

CADE, computer-aided design engineering in telephony. E. M. BCS South East branch. The Ritz, Bedford, 18.45.

OCTOBER 14 Regional electronic industries exhibition. Electronic Industries Association and Trade Fairs Ltd. Exeter, Devon.

OCTOBER 6 Computers in a law office. G. Andrews. BCS Law Specialist Group. Polytechnic of Central London, London W1. 18.00.

The use of computers in the services. BCS Medical Specialist Group. Connaught International Hotel, London W8. 14.00.

AS THE Summer Computer approaches the end of the season, Winter Knock-Out Cup is on.

All interested teams, of 0-11, whether from the league or should not, should note that there will be a knockout at the end of the season. Work out arrangements for Donny Braham on 01-242 11.

Tickets for the Summer river trip on October 8 are available from Danny Braham's £2.75 each.

And teams from outside the Manchester area interested in playing in a knock-out cup should possibly a league should contact Beccat at Cambyte Services on 081-828 5265.

COURSES

OCTOBER courses from Hoskyns include: programming management, October 10-14; project managers, October 10-14; commercial systems analysis (four one-week modules), October 10-November 4; operations supervision, October 17-21; computer systems design, October 24-28. For details of these and more, contact Valerie Orr, Course Registrar, John Hoskyns and Co Ltd, 81-83 Farringdon Road, London EC1M 3LB, tel: 01-242 1851.

A THREE-PART course of lectures on computer architecture is held by Brunel University. It is organised as a series of talks, each presenting an overview of a particular field and runs from October until June. Each talk is complete and can be attended independently of the others, or students can register for one or more terms. Further details are available from R. M. Lee, tel: 01-883 3823.

SOCCER

Announcements

AS THE Summer Computer approaches the end of the season, Winter Knock-Out Cup is on.

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Centronics to enter end-user market in a major policy shift

A MAJOR change to Centronics' marketing policy in Europe was revealed by Terry Harris, vice-president of the company's European operations, in London last week.

Hereto Centronics has concentrated almost exclusively on the OEM market, and although this will still account for a major share of the printer manufacturer's business, Harris said that "as part of our expansion plans we have decided to begin selling actively into the end-user and data communications markets in Europe... We see the end-user market representing a significant portion of our total European revenues."

The way in which the end-user market is served will vary from subsidiary to subsidiary. The UK company will operate through end-user distributors: Cable & Wireless in England and Wales, Dacoli in Scotland, and Cans Data in Ireland, with Cable & Wireless undertaking all third party maintenance.

In Germany, Centronics will undertake its own end-user selling and maintenance from offices in Frankfurt, Hamburg and Munich. And in France the company will use its own sales force in the Paris region but will operate through distributors in the provinces.

Spearheading Centronics' move into the end-user market is the 763, a 300 baud teleprinter which is available in RO and KSR versions, with a variety of optional features including an APL character set.

The 781 APL will be shown for the first time in Europe at the Sibex exhibition in Paris, which will also be the occasion for the official announcement and first showing of the 702, a 120 cps bi-directional matrix printer.

Also being exhibited for the

first time in Europe at Sibex is the Micro 1, a low-cost (\$745) non-impact printer developed in association with the Japanese manufacturer, Sharp. The Micro 1 prints at a rate of 180 lpm, with up to 80 characters per line, by way of electrical discharge on to aluminium paper.

The Micro 1 stands very much outside the line of development represented by Centronics' more conventional impact printers, but the company sees it as being particularly suitable for industrial, test equipment and mobile applications; for producing VDU hard-copy; and as an end-user product in the hobby market.

Following Sibex, Europe's next major computer show, Systems 77 in Munich, will see the official release of the 783, a 1200 baud teleprinter which was previewed at the NCC in Dallas earlier this year.

According to Terry Harris, the last 12 months have been a period of intense activity for Centronics in Europe. The European headquarters and the UK subsidiary are now based in new offices in central London. In Germany the Frankfurt offices have been expanded twice, and sales and service offices have been opened in Hamburg and Munich.

In Paris, too, the company has just moved into new offices, while a new subsidiary is being set up in Italy.

In Ireland, Centronics is planning to move from a leased factory to a new purpose-built plant.

The head-count of European employees has risen from only five two years ago to nearly 80 today, not counting the employees at the Irish plant. And Europe now represents 20% of Centronics' worldwide revenues.

Tim Palmer looks at four major new products



John King, director of marketing, ITT Business Systems, is a graduate of Bristol University and has some 20 years' experience in the DP industry. He has held senior positions in systems engineering, general management, consultancy and marketing with IBM, Telax Computer Products and Metro Consulting Group.

UK launch of ITT's challenge to SNA

A COMPREHENSIVE alternative to IBM's Systems Network Architecture portfolio of products has been put together by ITT Business Systems, and their launch takes the company a long way down the road towards the electronic office of the future.

The products were first announced in West Germany under the Communications Network Architecture label (CNW, March 17) and have since been introduced into France (CNW, May 12).

Formal UK launch takes place at the beginning of October, and the portfolio has been aimed down to four major products. The 3470 key-to-floppy disc system built by ITT in Spain is not yet offered in the UK.

Starting point for the portfolio is the well-established ITT 3280 cluster terminal system which ITT gets from Courier of Phoen-

ix, Arizona. The 3280 competes with IBM's 3270, and ITT claims that over 10,000 units are installed and on order throughout Europe.

No major enhancements have yet been made to the 3280, but IBM has announced major improvements to the 3270 which largely remove ITT's competitive edge (CNW, May 20). In response, ITT is discussing developments with Courier which will again give the 3280 advantages over the IBM 3270.

The key item among the new ITT products is the 3806 communications processor, which comes from ComTen of Minneapolis and competes with IBM's 3704 and 5 devices.

The 3806 allows much more of the communications processing load to be handled outside the 370 mainframe than does SNA, and ITT believes that it will enable users to build hierarchical networks without the need to upgrade their mainframe.

In addition, one 3806 can front-end two similar or different mainframes, and the device is usable both as a front-end and a remote concentrator for more economic line use. The 3806 handles terminal polling, and a Terminal Initiated Line Switching package enables the terminal user to switch between applications and software packages.

ITT has a second processor, the 3807, for people needing a front-end with more line capacity than the 3806 offers. The two are software-compatible.

As a remote concentrator, the 3805 can emulate the IBM Haap multileaving workstation.

Compatibility is offered with SNA for people wanting to use some of the IBM devices, and non-standard terminals are also supported.

The ITT 3830 is a new range of remote batch and remote job entry terminals acquired from the Massachusetts-based Linolec subsidiary of 3M. The small integral processor which takes up to 32K of main memory is built by Linolec, and there is a microprocessor to handle communications. Programming is in assembler, and utilities, diagnostics and a data entry generator are also included. Secondary storage is on two to four 256K-byte floppy disc drives.

There is an integral VDU and keyboard, and other peripherals supported include magnetic tape, card reader, badge reader, character and line printers. Large cartridge discs are to be introduced shortly.

Emulations offered include IBM 2780 and 3780, ICL 7020, Burroughs and Univac, and communication is at up to 9600 bps.

The 3230, built by Courier and developed in conjunction with ITT, has no direct IBM counterpart. It is a teletype-compatible display system for data entry and file inquiry and update. It offers floppy disc storage, and one printer can be shared between several display stations.

EMS aims for £2m from small firms

LATEST contender for a share of the fast-growing small business systems market is Executive and Management Services, EMS Consultants.

The company sees a potential market of 30,000 businesses employing 100 or more people, and plans to "market the essential simplicity of computing without confusing the customer with jargon."

EMS plans to offer systems at a hardware cost of between £15,000 and £30,000, and is developing application software packages in Cobol for lease to customers.

The main packages are being developed for October release, covering financial management, sales order processing and payroll. Each package will cost about £1,000 a year to lease, but EMS will also tailor packages to user's requirements, or design

new systems from scratch.

EMS has chosen the Honeywell Level 1 minicomputer for its new venture, and has placed an OEM contract with Honeywell for 80 minis over the next 18 months.

EMS has installed its own 6/43 mini in a new customer data centre at Five Ways, Birmingham, and customers are promised same-hour answers to software queries when they use the "hot line" to the data centre.

The software packages are being written to be compatible with those available for the ICL 2803.

EMS is designing what it calls "new concept" workstations for the system, which will allow two operators to share the VDU.

The company is looking for £2 million of business with the system in 1978, and £4 million in 1979.

USAF satellite launch

A JOINT National Aeronautics and Space Administration/US Air Force project is to investigate disruption of communication satellite services caused by charged particle bombardment from the atmosphere.

Called SCATHA (Satellite Charging At High Altitudes), a scientific instrument package

satellite will be launched by the US Air Force in January, 1978, to investigate conditions at and near the geostationary orbit height of 22,300 miles.

Two NASA centres, the Marshall Space Flight Centre in Alabama, and the Goddard Space Flight Centre in Maryland are taking part in the project.

Harris wins \$8.5m order

UNDER what is claimed to be the biggest single US Federal procurement for computer terminals, Harris-Nashua Operations, formerly Sanders Data Systems, is to supply 200 Harris 8171 remote terminal systems worth \$8.5 million to the US Defense Logistics Agency over the next five years.

The Harris equipment will be installed at 22 sites all over the US and will be linked in IBM 3270 mode to mainframe computers. The applications will be data entry, the inquiry, data retrieval and distribution control relating to the \$9 billion worth of goods that the Agency supplies to the US armed forces.



OPPORTUNITIES IN WALES & THE WEST COUNTRY

Why many of the big firms have 'gone West'

By Alan Halfacre

IN this thumbnail sketch of the computer industry in the West Country, I will outline the problems employers feel they have in attracting members of that industry.

The basic problems of recruiting in any sphere of technology are divided into the working and social environments. The image that is created of these two areas is fundamental to the success of attracting and keeping key staff. My experience of the West Country leads me to believe that probably in both areas the employers undersell the potential opportunities.

In the West Country, local authority and central government installations tend to be bigger and thicker on the ground than in most parts of the UK. If

neers seems higher than most other parts of the country, with installations already in most towns and some areas becoming quite significant 2900 centres.

Swindon certainly seems to have a multiplicity of existing or planned 2900-based companies within a 20-mile radius, something worth keeping in mind when considering job opportunities. System 4 and 1900 users of course have a major influence on the computer spectrum of the area. Among the hordes of 1900s there are some System 4, notably four machines in Bath and five in Bristol.

Of course, there are the others but they are generally in the small machine business with the occasional monster like National-

erty is reasonably priced throughout the region when compared with the Home Counties; but there are some obvious exceptions. Don't expect a three-bedroom semi with a sea view at Torbay for £15,000, but think about Swindon or further west and you have a potential choice of houses between £10,500 and £12,000.

For those who want to take the opportunity of small town life within 20 minutes of the computer, Swindon would offer detached three-bedroom properties at £14,000 upward and semi at £12,000 plus, all within a radius of 10 miles. Certainly for those moving into the area from the London commuter belt, life is different, but housing and schools should present no problems.

So if it's really so attractive why isn't everyone flocking to work here? Having discussed the situation with a number of companies it appears that their views come down to two basic areas of concern: There appears to be a dearth of adequately experienced staff on the market. This is not because they do not necessarily exist but under present economic circumstances job security is put above all things. No one wants to be last in, first out. Additionally it appears that agencies are not clearing down their books so that they are becoming less effective.

The other aspect, it is widely felt, is that the right staff are not available at the right price. One company said it would not accept experienced ICL operators for their IBM system, it being easier to use trainees. Certainly, W. H. Smith has felt that finding experienced system support staff is difficult because they are so few and far between and those that do gain experience in industry often gravitate to ICL.

I have not deliberately avoided discussion on salaries; I do not believe there is much to be said. Every company has had problems due to the pay freeze but any differential between say London and West Country rates is swamped by the variance in salary paid by different companies for the same job.

In summary, if your experience is with ICL or IBM, or if you have no experience at all as an operator, analyst or programmer there would appear to be good job opportunities with progressive companies. Do not forget that a significant proportion of the

major companies have moved West over the last 10 years to avoid the problems of London. As far as the family is concerned, I don't think they will be disappointed.

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PROGRAMMER

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Jane Leiper,
CMG Computer Management Group
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Westway House, 320 Ruslip Road East,
Greenford, Middlesex UB6 9BW.
Tel: 01-578 4563

OR
Janet Gotherd,
CMG (West End) Limited,
Sunley House, Bedford Park,
Croydon, CR0 2AP
Tel: 01-686 8251
(To be relocated in London)

OR
Ann Howlett,
CMG (City of London) Limited,
Eastgate, 73 Leamington Street,
London, E1 8EY
Tel: 01-481 3881

OR
Barbara Clerk,
CMG Computer Management Group
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Bedford Park, Croydon, CR0 2AP.
Tel: 01-686 8251.

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Programmers and Systems Analysts

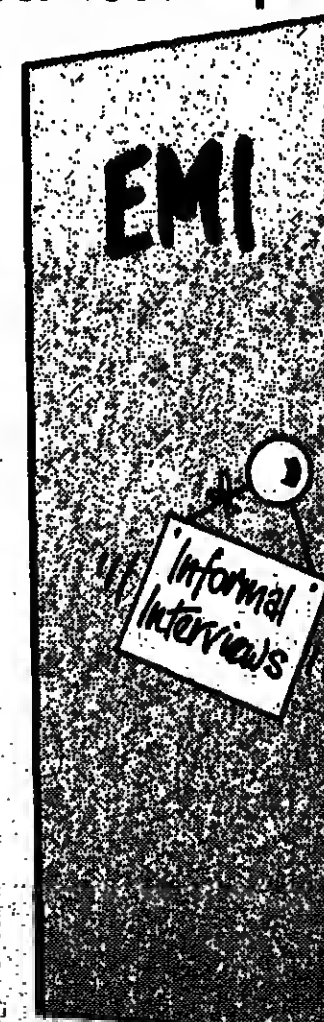
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Applicants should have at least two years' experience in a data processing environment, preferably on the ICL 1600 range.

The Polytechnic Computer Unit provides a central batch and on-line service based on a BSC CL 1401 with E0680's, communications and graphics.

Salary scale: Technician £21, £2322, £2400 plus £312 and 6% (approx.) per annum (supplements plus qualification allowances).

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For application form (reference to Manchester, 20, 1977) please send a self-addressed envelope marked '7704' to the Secretary, Manchester Polytechnic, 40, Oxford Road, Manchester, M6 9PU.

PROGRAMMERS

The Communications and Control Group of Ferranti Ltd, Edinburgh, designs and markets telemetry / telecontrol systems for remote supervision and control of oil installations, electricity, gas and water undertakings, and other projects.

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Taking right steps in exporting software

By Alistair Jacks

IT is only recently that the computer industry in general has moved out of those much-publicised ivory towers.

Technology costs have been falling and business costs have been rising: both factors have tended to heighten our awareness of the computer as a profit centre in the organisation, with acquisition and operation costs being offset against positive benefits to the user company.

That kind of maturity in the marketplace has actually encouraged suppliers of data processing services and systems to adopt more realistic attitudes in their operation.

The development of the software products business is on the leading edge of this trend. Software packages are relatively cheap, typically about the same price as a new car, so the buyer is not immediately antagonised or frightened by the price.

And they are identifiable products that usually do very specific things: it is relatively easy to quantify the effect, and it is equally easy to decide whether or not you actually need the product. Furthermore, the buyer is very likely to find a choice of products to do that job.

So if the computer business as a whole is moving nearer to the conventional commercial environment of buying and selling, the software products end of it is getting there faster.

At the same time it cannot be denied that the market is still a specialist one, requiring considerable specialist knowledge and consisting of buyers that require a good deal of expertise from any salesman.

Assuming that the vendor has decided that exporting is desirable it is simply a question of deciding how to go about it.

There are three approaches: you can go over yourself and market to the user, you can set up local companies and employ your own personnel or you can arrange local agents and distributors.

While visiting from the UK may be a suitable approach for large scale capital goods, to establish sales for a product which sells in volume requires local representation.

Obviously the third option must be cheaper for you in the short term, but to some extent you lose control of the product's presentation, and you certainly lose quite a large amount of the product's purchase price.

The agent's share can be something close to 70 per cent of the price if he is also providing local technical support, at the very least he will demand between 40 and 50 per cent.

On the other hand, the agent knows his market and is probably well established in it; clearly you would not have picked him if this was not the case.

Setting up a local company has its own problems. For instance, it is not easy searching for appropriate offices from a base 400 miles away, dealing in a foreign language with foreign employment and building-use regulations.

The estate agent is likely to be only the first of many people who could take you for a ride. And how do you find and assess suitable candidates for the all-important front-office jobs - the secretary, receptionist, typist, telephone operator?

Even the apparently trivial details - like how to get your telephone number listed in the phone book and the appropriate commercial directories - can present problems.

Our experience is that it will

Suppliers of services have been forced to take a more realistic attitude towards the operation of their businesses as of late. And the software side is in the forefront of this trend.

While the market is specialised, its exploitation still requires the same skills as for other markets. This is

particularly so for exports.

The UK is the software world's "bargain basement" and Alistair Jacks asks that prospective exporters think carefully about the way in which they approach the problem.

He offers suggestions for avoiding some of the pitfalls for firms entering

the software products export field.

Alistair Jacks is the country manager of Computer Program Products (UK) which is the international software products marketing arm of the CAP-CPP group. CAP-CPP is a member of Insec, the NEB's computer services company.

can seem comparatively easy after all that. There is an astonishing similarity between IBM users, for instance. This is the principal market for CPP products, and we find that the North American bias generally, together with the fact that most 360/370 documentation is in English, considerably simplifies the job of selling IBM-compat-

ible software packages. In the metropolitan areas - especially in Holland - there is a willingness to use independently-supplied software and a good deal of knowledge about the products.

And not the other extreme, there are some relatively remote areas where the paucity of local job opportunities and the desire

to share problems means that one sale for a product can quickly lead to others simply by the word of mouth contact between installations.

Support is the other important factor. No user with any sense is going to consider a poorly supported product, but support can be an extremely expensive feature of the software products

exports business. The key to profitability is minimising the level of support needed, by offering a stable product in a predefined environment.

CPP's approach to support is for local subsidiaries to offer a local level of support, but with a strong central technical support group based in Amsterdam.

At present CPP's main interest is in IBM-compatible packages, but in the near future CPP's European operations will start promoting MicroAde in earnest. MicroAde is a very different sort of product; it is a £10,000 development system that produces Cobol programs for microprocessors, and it runs on a Digital Equipment PDP-11 minicomputer.

We did consider organising agents for MicroAde. It is, after all, a very different product to the IBM packages. But our experience and our aims both indicated that by promoting MicroAde through the present CPP system we would achieve significant market penetration at least a year before any agency could.

That brings us to North America and the Insec connection. Insec Data Systems is the NEB subsidiary that is currently formulating its plans for the overseas promotion of products and services of its members; MicroAde could be the first product that is pushed through Insec.



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April 1978

How to get your money's worth from software packages

By Zoran Pirjevec

REACHING a final decision point on buying software is not easy, as people who have been on the Magical Technical Tour well know. Sometimes even the final results aren't enjoyable either.

It is agonising to spend great amounts of time and end up with a software package that doesn't do exactly the job you want. It is many times more agonising to try to write a system that is perfect, however, and that is why the software was purchased to begin with... and why the shortcomings are lived with.

In recent years, we have seen a common methodology develop for the evaluation and acquisition of proprietary software. That methodology states that you will (1) identify your need, (2) scour the directories for possible solutions, (3) write to vendors for literature on products, (4) schedule presentations with those with the most promising literature, (5) evaluate the products in the final running, and (6) make a final purchase decision.

This whole process is a narrowing-down exercise with the ultimate purpose of finding the best package to meet a need. The trick of making the search as fruitful as possible is to make the search as short (inexpensive) as possible, but without sacrificing confidence that the end product is the best available.

As a software vendor who has been around since the Great Unbundling of 1980, with some 4,000 customer companies around the world, we have been

able to identify some short cuts and information gathering techniques that people can use to shorten that software acquisition cycle with greater confidence that their final choice is the right one. One still has to identify the need and survey the catalogue for the choices available. The intention of what follows is to shorten that narrowing-down process.

The first short cut comes into play shortly after one has identified the need for a specific software solution. It is called "knockout factors," a list kept in mind all the way through the process.

There are the obvious ones of upper cost limit, modifications necessary to make the package run on your machine, amount of core required, payment plans available (if you can't afford large sums of money at once, lease is essential for acquisition), cost of on-site evaluation, hardware/language restrictions, etc. Two additional areas of knockout factors should be explored early in the acquisition cycle. The first is the company behind the product. The second is product applicability.

When you are looking for a home, you are well advised always to look at the basement first before being excited by the wallpaper or the size of the master bedroom. The foundation is what holds the whole thing up. Software purchasing is no different. The company behind the product is the system's foundation. And it should be explored thoroughly.

You are ostensibly purchasing software for a long-term benefit. You are paying a good deal of money for the software to keep up with hardware technology and computing advancements.

You want to make sure that is the intention of the company behind the products. If a company is profitable and successful, that is a degree of proof of market acceptance and stability. These are questions you should ask:

What is the sales and profitability history of the company? What is its financial strength? How old is it? What user organisations exist for your products? How widespread is your serviceability? Local? National? World-wide? How many products does your company sell? How many are on the Datapro Honour Roll of Software? Is the company a member of the Computing Services Association?

Assuming that the company behind the product looks sound enough to grow with your data processing needs, it's time to ask some pointed questions about the product itself. Try these:

1. What is the product's enhancement record? This will tell you just how well the product is keeping up with technology.

2. Is there a maintenance fee for this product, and if so, what do I get for maintenance?

3. What kind of technical support is there? Telephone only? Is there a periodic problem reporting system?

4. How good is documenta-

tion, and how often is it revised? Documentation is never perfect, but vendors who strive to approach perfection have your best interests at heart.

5. What kind of training do I get with this product? In general, the more comprehensive a system is, the more training is required. One should expect on-site or personal training of key personnel upon installation with possible follow-up training included as part of the purchase contract. The better the training, the more use the product will get and, thus, the more benefit it will be to your organisation.

6. How many installations are there of this product? You will find that the more installations there are, the more bug-free the system will generally be.

7. What modifications are necessary for installation? If there are any, they will cost you money. Find out how much.

8. Is there any charge for evaluation? This should have been stated at the beginning but it never hurts to ask.

Now that you have tested both the company behind the product and the product itself (all of which can be done on the telephone), you are ready to take some other short cuts that will get you to that successful software goal.

Chances are very good that, after you have qualified the vendor down to this point, he can give you excellent ideas on how to use the product.

Ask for user references in your industry and with your

specific machine type and operating system, and contact them to find out about their experiences. The vendor can be used as a cost-free consultant during the process of software acquisition. He is a walking repository of information on cost-justifying his products, studies that show the benefits of his products, experiences of others both with and without his product, etc. It is also common and fair to ask each vendor about his competition... not to downgrade another product, to illustrate the superior or unique aspects of one product over another.

Get information from professional societies such as the British Computer Society or the Data Processing Management Association. Also try members of your hardware user group. It is likely that if you have more than five people in programming and management in your installation, some of the people are relatively new. And it is likely that they have had software experience elsewhere in the data processing industry. It won't take long to ask your people if they have familiarity with any of the packages you are considering.

By no means should their opinion be the last word on the system evaluation, but their input can certainly give you some direction as to the questions that should be asked in a broad sense. There is a side benefit of such a polling, and that is that the employees have to have input on major deci-

Zoran Pirjevec, of Panaphic Systems UK, has eight pointed questions to ask before coming to a final decision on which software to buy. And he concludes that the key to success is the reliability of your peers, and the information they have been able to glean through first-hand knowledge of various software systems.

French install computers to probe UFO mysteries

The mystery of unidentified flying objects could soon be penetrated when a voluntary society in France begins its aim of installing two computers.

The Society for the Study of Spatial Phenomena, based in Toulon on the south coast, aims to install computers at a

research centre it is setting up, and on board a mobile observation unit to control radar, meteorological equipment and spectrometers.

The society, with members ranging from 13-year-old schoolboys to doctors and high ranking officers in the armed

forces, insists that it studies only hard facts and that the research centre and computers will help it along this path of objectivity. It also claims that they will put it ahead of similar organisations in other European countries.

This need for more accurate

information on UFOs is shown by the fact that the US air force has investigated 12,000 sightings over the last 20 years.

About 11,300 have been identified as things like weather balloons and reflections of the moon; but that still leaves 700 to be explained.

Racal stake in Plessey stirs industry speculation

RENEWED speculation over a possible restructuring of the UK electronics industry has been stirred by the announcement that Racal Electronics now has a tiny holding, 0.4%, in Plessey.

Deca also features strongly in talk of a restructuring, but the company's chairman, Sir Edward Lewis, is understood to be against the proposals for a rationalising of the UK electronics sector to produce a

second group to compete with GEC for a bigger share of export markets.

Racal has also declared small stakes in a number of other companies not directly involved in the computer industry.

Racal's new policy of building up small stakes in a variety of companies has aroused some critical comment from observers who say that the company is beginning to look like an investment trust — a company whose main business is investing in the

shares of other companies — and ask whether this is the most appropriate use for the shareholders' money.

If this view gained strength it would tend to hit the Racal share price because most investment trust shares stand at a discount of about 30% on the value of the underlying securities they hold.

"The City is unhappy because it does not understand what is happening," a Racal spokesman told Computer Weekly.

"We have £40 million cash to invest, and our investment department believes that at the moment it is better to invest in well-managed British companies than in bank deposits or fixed interest stock now that interest rates are so low.

"The chairman has also said that Racal is acquisition-minded, but we have been buying and selling shares for years. And as for our own companies, any of those which want money for expansion can have it."

NEWS IN BRIEF

Zygal to design Sigma console

A CONTRACT to design and manufacture a control console for the Xerox Sigma range of computers has been awarded to Zygal Dynamics.

The contract, placed by Teleflex Computer Products Inc, is for ten consoles, and shipment is due within the next few months. Each will be based on a Diablo HyTerm, and will be used as a primary I/O device.

THE Federal Highway Administration of the US Department of Transportation has awarded a \$177,000 contract to Honeywell to study and improve software for digital computer-controlled traffic signal systems.

Honeywell's traffic management centre in Minneapolis will conduct the four-year project.

MAKING a contribution to the relatively new science of colorimetry is a Digital Equipment PDP-11/05, linked to a spectrophotometer, which is being marketed by Color Assistance, a French company. The system also features a VT50 video terminal, a teletype, an LA38 DECwriter II and a graph tracer.

Couple that information into your own and you will want more chance of picking the right product.

THE manufacturing and development facilities of Univac's disc drive manufacturing subsidiary, Information Storage Systems, are to be consolidated in a new \$15 million centre at Santa Clara, California. Most of them are already located in that area, about 50 miles south of San Francisco. They produce disc drives partly for Univac, OEM customers, and the IBM plug compatible market.

A HIGH density bulk add-on memory for minicomputers has been introduced by National Semiconductor. Called the NS3-2, it uses 18 pin 18K bit dynamic RAMs and is supplied in the form of PC boards, each with a capacity of 128K by 22 bits. The access time is 280 nanoseconds and the read/write cycle time is 450 nanoseconds.

HIGHLIGHTS of the financial results announced by Digital Equipment for its fiscal year ended July 2 include worldwide sales of \$1,058 million, 44% up on the year before, and a 35% increase in European turnover to \$258 million. DEC's net profits worldwide in fiscal 1977 were \$108 million compared with \$73 million in 1976.

Robot language developed by IBM

AN experimental programming language that allows the user to program industrial robots with English-like statements has been developed by IBM.

Called Autopass (AUTOMated Paris Assembly System) it features such familiar assembly terms as LIFT, PLACE, INSERT, and TURN, and uses a database called the "world model" to internally represent the machine's "real" surrounding environment.

Full details of research that has taken place on Autopass up to now is presented in a paper by Lawrence Lieberman and Michael Wesley of the IBM Thomas J. Watson Research Centre, New York. In the latest edition of the IBM Journal of Research and Development.

The authors say that the language is aimed more towards objects and assembly operations rather than motions of the mechanical assembly machines themselves.

"The level of language has

been chosen to provide a high degree of assistance to the user without systems having to perform artificial intelligence type problem-solving operations," they say.

Operating as a subset of PL/I, Autopass is said to offer many of the control and data type facilities of that language.

Access times reduced

ACCESS times for the Mostek 4K and 16K dynamic RAMs have been trimmed back to 120 nanoseconds, with a projection that by the end of the year access times will have been further reduced to 100 nanoseconds.

The memory cycle time now stands at 320 nanoseconds and power consumption is 482 milliwatts in the active state, and 20 milliwatts when on standby.

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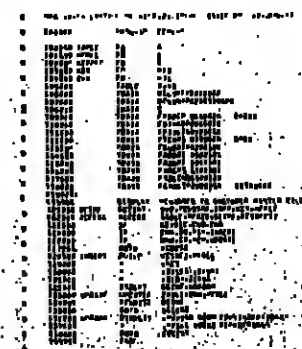
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Visual Display Units and their application

Edited by Derrick J. Grover
Chairman, British Computer Society Displays Group

Visual display units provide one of the latest means of interaction with a computer, and they are being employed in industry in ever-increasing numbers. Their applications are wide-ranging, including business transactions, stock control systems, information retrieval, stock-market and insurance quotations, text editing and information updating.

VISUAL DISPLAY UNITS are based on a tutorial seminar organised by the British Computer Society. The book is intended for computer users who already employ VDU's or plan to use them to enhance their system. It will be of equal value to management in their best decision-making, and to the systems analysts and data-processing managers who put those decisions into practical effect.

Review and revised Derrick Grover, British Computer Society. Technology of VDU's by Derrick Grover. Communications by Peter Thomas, CBE. Intelligence and Information by Derrick Grover. Software by Brian L. Loughrey, CBE. Human factors in the design of VDU's by Derrick Grover. Human factors in the use of VDU's by Derrick Grover. Human factors in the use of VDU's by Derrick Grover. Human factors in the use of VDU's by Derrick Grover.

Obtain your copy now from: The book is available from: IPC Electrical-Electronic Press Ltd, Dorset House, Stamford Street, London SE1 9LU. Telephone: 0432 74661. Telex: 83 83 83.

DATAFAIR 77 John Kavanagh previews the BCS biennial conference

Theme goes wider than 'the end user'

GIVING Datafair the title "the end user" is not doing it justice, for although the papers are all relevant to that theme most of them are of much wider significance, not only to end users but also to data processing departments and even to the way companies are organised.

Onespeaker who points to the changes that computers are bringing to organisations is David Butler, chairman of consultancy Butler, Cox and Partners. He lists four areas of rapid development which are highlighted by the convergence of computing and communications.

First, he says, public and private networks are becoming a major preoccupation; secondly, distributed processing allows us to put computer power where

it belongs — next to the person with the problem; thirdly, computerised telephone exchanges are becoming popular; and finally, different types of traffic — voice, data, texts — can be integrated into a single network.

But, says Butler, problems are accompanying these developments. What sort of integration is desirable? How will data processing managers face up to evaluating new methods? Will total chaos result from too much distributed processing?

Philip Hughes, chairman of Logics, wonders whether cheap hardware will give back to the end user the control he had over filing and information processing before the computer came along.

The changes should benefit the manager, says Patrick Losty,

professor of business systems at Crsfield.

Advances in system design and in technology and moves from data systems to information systems will see a shift from a systems-centred philosophy to a management-centred one, he argues.

"In a few years the clash between computing structures and management structures, the difficulty of interrogating files and the problems of modifying systems will worry managers less. The current constraints upon the design of information systems will be relaxed, and more flexible information generating systems will match the realities of the manager's life."

"The manager who has operated as a bridge between the end user and the computer will find



Two speakers from abroad are Kaoru Ando, president of the Fujitsu Institute of Computer Science, who will bring visitors up-to-date with Japan's "information society", and Drude Berntsen, director of the Norwegian Computing Centre, who will talk on "distributed bureaucracy", basing her speech on her work on the Norwegian government's data decentralisation committee, which looked at issues arising from the decentralisation of public sector computing.

his role in many respects less stressful."

Professor Losty also believes that the falling costs of hardware will make software inefficiencies unimportant. "The manager should assume the role of making sure systems are used effectively. The argument will swing away from economic use of expensive hardware to effective use of cheap computing."

Mike Cooley, a past president of TASS, the white collar arm of the AUEW engineering union,

looks at the effect of computing on staff. He discusses the impact on the creativity, job fragmentation, specialisation, alienation, knowledge obsolescence and what he calls the proletarianisation of white collar staff, arguing that the belief that automation frees humans from routine, back-breaking and soul-destroying tasks, is completely false.

John Powell, data processing manager at Prudential Assurance, considers that the end user expects help both from the computer industry and from government. He says the user wants help from the industry in using technology to meet company objectives.

Powell says that from government, the user needs help in getting a reasonable return for his investment, plus freedom of choice.

The show that caters for all tastes

PRESENTATIONS by hardware and software companies will truly complement the Datafair conference with its "end user" theme, while a "technology corridor" will give visitors a chance to see technologies of the not-too-distant future, such as voice data entry, bubble memories and speech synthesis.

Six companies will be featured in the technology corridor. Quast Automation will show its Datapad, which accepts hand printed data; Plessey will show users who bubble memories are all about; and Farrant will explain the design and manufacture of large scale integration devices.

Systems involving speech will be featured by three companies. EMI Threshold will demonstrate air traffic control, cash and carry checkout and parcel sorting applications on its voice data entry terminal, while Electronic Music Studios will present a computer controlled speech synthesiser called Vocodex for the first time in the UK.

And Mike will be out to steal the limelight from Adam on Logical Machine Corporation's stand. Mike is a voice recognition system, while Adam is the now well-established business computer which is claimed to be the first computer to allow users to create their own systems in their native language.

Another EMI company, SE

Specialist presentations

SPECIALIST groups in the British Computer Society will be giving presentations one after the other throughout Datafair.

The timetable for the presentations is:

October 4: 2-3.30, microform group; 4-5.30, disabled group; 6-7.15, business information systems group.

October 5: 9.30-10.45, computer operations group; 11-12.30, auditing by computer group; 2.15-3.45, first time user group; 4.15-5.45, Fortran group; 6-7.15, PL/I group.

October 6: 9.30-10.45, privacy

Changing roles at work

THE British Computer Society's biennial conference, Datafair, starts at noon on October 4 to the topic of the user in a social environment. Papers will cover the changing role of management and labour, distributed bureaucracy and the Japanese "information society".

On October 5 the topics will be how new technology will affect the user, and the convergence of communications and computing.

Speakers on October 6 will look at the relationship between the computer industry and the government.

Running alongside the conference will be an exhibition of hardware and software companies and presentations by the BCS specialist groups.

Datafair will be held at London's Cunard International Hotel. Tickets cost £97.20 to BCS members, £27 to student members and £113.40 to non-members. Prices include lunch, tea and coffee breaks, and VAT. The BCS dinner on October 5 when the speaker will be Sir Monty Finniston, costs £14. Details from Oyez BCS Ltd, Norwich House, Norwich Street, London EC4. Telephone 01-252 2481.

Labs, will show its SERP electrostatic printer, which runs at 550 lines a minute.

Printer terminals ranging in speed from 10 to 120 characters a second will be shown by the printer equipment.

IBM will feature its 3127 interactive terminal and the 3780 electronic telephone exchange. Communications equipment will also be shown by General Audio and Data Communications, which will feature its line monitor switch and patch equipment for V24 modem interfaces.

The Post Office will give informal lectures on topics ranging from the organisation of the Post Office to modern developments. Tickets for these lectures must be reserved in advance: telephone 01-432 1000.

Software houses and consultants giving presentations include BIS Applied Systems, CAP with its Micro-Cobol business language; Solve; Arthur Anderson and Co; Data F International; InfoTech; and its training courses; Logica; and Pactel.

The National Computer Centre will talk about its software — including Filebase and its books.

And visitors who are disappointed with the British Computer Society can find out all about the Institute of Data Processing

committee; 11-12.30, UK disabled group; 2-3.15, disabled group; 4-5.15, disabled group; 6-7.15, disabled group; 8-9.15, disabled group.

The disabled group will present Mavis, described as a prototype mini-information system which supports special needs which can be used by the disabled.

The operations group will show how operations can be done by the end user.

The simulation group will give a broad introduction to the principle and practice of computer simulation.

specialist presentations

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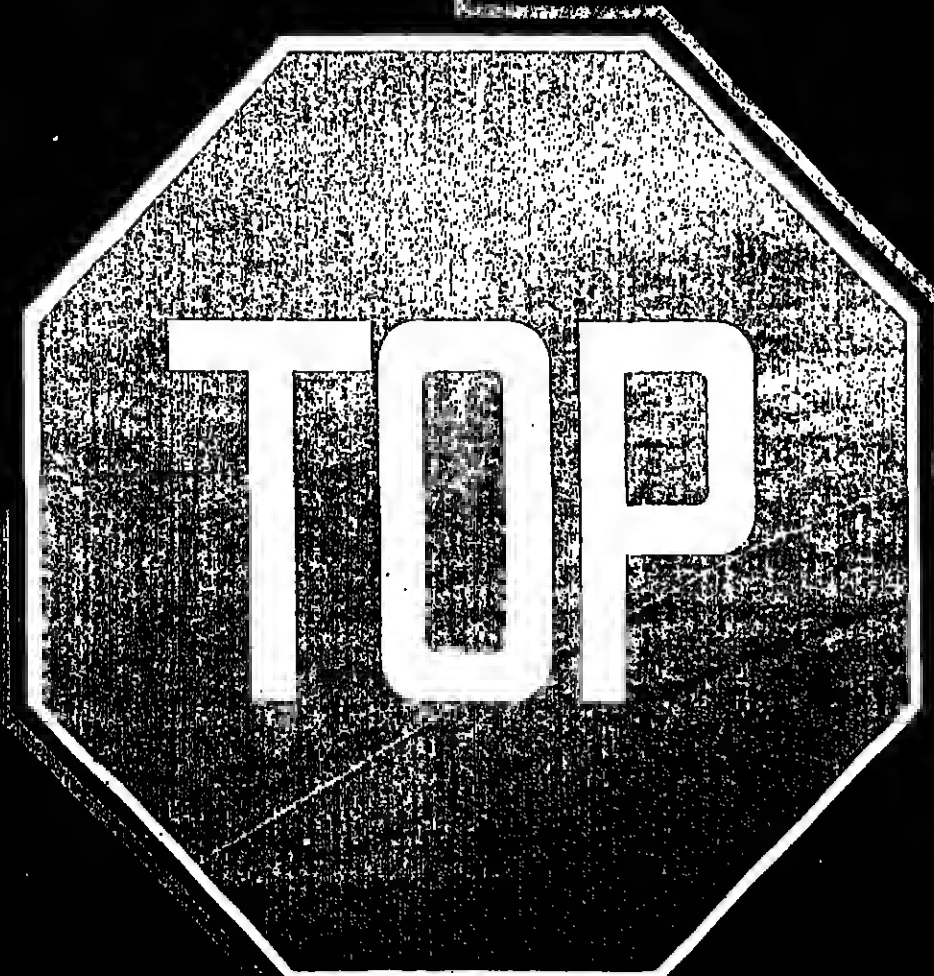
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● From page 4

John Pitt . . . "I want to double the profitability of Modcomp's European operation on its current level of business, and only then will I invest in growth."

"At the moment we have no separate sales team for com-

from US and European
facturers.

Three other sections
in detail marketing and
call features and provide
8-inch one-sided, 8-inch
sided and 5.25-inch drives.

Tables list the reviews
are expected to be given
each year up to 1990 by
type of drive and by
types of manufacturers in
and Europe — IBM, other
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0	1	2	3	4
11	11	23	7	8
22	33	12	29	20
33	22	34	40	31
44	44	45	51	53
				27

Table 2: $y = x^2$, modulo 55, d

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Despite serious losses last year in the US, Modcomp in

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Closing date: 5 p.m. on Wednesday, 5 October, 1977.

For further details and application forms, write to the Personnel Officer, Arus Sleire, Patrick Street, Kilkenny, Ireland.

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PROJECT MANAGERS TO £9000. Large ICL installation and Production Control Specialist with Man Management experience in a real time development.

ANALYST/PROGRAMMERS TO £4750. Mainly 'new power' Manufacturing Areas. Cobol background, experience for ICL Systems Operations Controller £4250. IBM 370/148, etc.

YORKSHIRE
IBM PROGRAMMERS TO £1800 P.W. 9 Month Contract with COBOL + CICS and/or OLI experience.

MANCHESTER
ANALYST/PROGRAMMER TO £4000. Main Computer Systems and Interactive Systems, opportunity to gain experience of Divisional and Time.

Company GRADUATES waiting a career in the Computer Industry will have a sound commercial or Accounting background and a good COBOL would be useful. First-class working conditions and a good mind essential.

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HALIFAX 0422 58232

MANAGEMENT & EXECUTIVE SELECTION

telephone 01-637 9611

SALES LONDON

Total Earnings **£10K** + Car

Following its 3-year success in Europe the largest independent bureau in the world is now expanding and setting up an operation in the U.K. They are looking to recruit experienced sales people to sell their batch processing accounting systems and in particular a payroll package. As this is a new venture, there is the added attraction of promotion to sales manager, within a year, for the right person. A comprehensive training course and extensive back-up in terms of advertising campaigns and mail shots are planned to ensure the success of this project.

Contact Faye Ogilvie.

SALES SUPPORT to £7200 WEST LONDON

Technical Advisers are required by our client, a world-wide mini computer manufacturer to work in pre and post support roles. To qualify for these positions, certain attributes are necessary. They include the ability to communicate effectively, an outgoing personality and experience in commercial programming and systems analysis. Preference will be given to those with experience in project management. The successful candidates will be involved with a wide range of commercial applications for a variety of users.

Contact Peter Gorton.

SUPPORT ANAL **£6K** CENTRAL LONDON

The ability to establish a close working relationship with users is essential for this role. Our client requires a responsible person capable of acting independently to co-ordinate the systems and programming support required by their users. Liaison with both manufacturer and software house will be necessary to ensure this. You will also be responsible for the analysis of new system requirements. Commercial experience gained on mini computers is essential, priority will be given to those candidates with real time systems experience gained on DEC equipment.

Contact Pam Quinlan.

PROGRAMMER Neg.C. **£3,750**

CENTRAL LONDON

A NEAT 3 programmer, preferably in his/her early twenties with a minimum of 9 months' experience, is required by our client. The installation is comprised of a disk based NCR 75 computer which provides management, financial and computer services to the motor and finance industry. Candidates' initial duties would include writing new programs, amending existing programs and maintenance work, on a fairly even proportion. Career progression into systems analysis and/or management is actively encouraged. Starting salary would be negotiable depending on age and experience.

Contact Rowland Middleton.

LECTURER **£4½-5½K** DUBLIN

Two years' commercial DP experience and a knowledge of IBM COBOL are all the qualifications required for this well paid, rewarding role. Our client, the largest independent software house in Europe operate an established training school, which specialises in giving courses to foreign nationals. They currently require a self-motivated, presentable person to give their introductory level courses. Essential personal attributes are the ability to communicate ideas clearly and carefully. This is a unique opportunity for someone either living in Eire or wishing to move there. Assistance with relocation expenses will be given and travel at a later date is a distinct possibility.

Contact Pam Quinlan.

Area SALES Manager Basic to **£7K** LONDON EAST

Quota Earnings **£12K** + Car

The vital qualifications for this position are an excellent and unbroken personal success record in sales, experience of sales management and a thorough knowledge of the bureau or mainframe market. Our client is a major force in the bureau market offering a wide range of services including commercial and scientific packages, custom built systems, time hire, etc. This is a newly created position brought about by the increasing demands for the bureau services and resulting expansion.

Contact Faye Ogilvie.

SALES Quota Earnings **£10K** + Car LONDON/B'HAM/M'CHESTER

Our client, always in the forefront of the mini computer manufacturing field, is aiming to further their success by the expansion of their sales team. They are currently seeking experienced sales people with considerable knowledge of commercial systems and a good sales record, to sell in the areas listed above. The realistic target makes the quota earnings within easy reach and the consistent growth of the company allows scope for career development.

Contact Faye Ogilvie.

PROJECT MNGR. to **£7K** MANCHESTER + Car including Bonus

An experienced team leader is required by a mini manufacturer to lead a project team of 4 people, increasing to 12 within a few months. The successful candidate will be one of three managers in the Systems Development Group, which is self-supporting within the company. He or she will be involved with all aspects of the work, both technical and managerial, and be able to meet financial targets in a very competitive environment. Only ambitious, strong-minded people with commercial systems and Assembler level programming experience need apply.

Contact Rowland Middleton.

PROGRAMMERS to **£4200** HERTS.

COBOL Programmers are required by our client, one of the leaders in the retail/distributive industry, to develop and maintain a wide variety of projects including communications and commercial systems. They are a well established 1804S installation - which will be upgraded in the near future to a new line of sophisticated hardware - and desire candidates to have at least 18 months' experience. A knowledge of PLAN would be a distinct advantage. There is a lively working environment and an active social life using their sports and social facilities.

Contact Rowland Middleton.

W'SHOP SUPER. **£5K** S. KENSINGTON

Five years' computer or peripheral experience gained in either the workshop, factory floor or field engineering environment is desirable for this position. Our client, a major supplier of computer peripherals, require someone to control and monitor the throughput of their small but expanding workshop team. You will also be required to provide technical assistance on PCs, electro-mechanical and general machine repair. This is an excellent opportunity to move into a supervisory position and still maintain technical involvement.

Contact Peter Gorton.

Suite 201/6 Albany House 324 Regent Street London W1R 5AA 01-637 9611

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What motivates you most about your job?

If your primary considerations are environment, working for a company with an excellent reputation in its field, the opportunity to contribute to the company's growth, and this effort and interest rewarded with management responsibility at an early stage, then these positions could be of interest to you.

Our client is young, dynamic, and well established, very pleasantly located on the Surrey/Hampshire borders within easy access of the M3. Specialising in certain sectors of industry, they have achieved a sound foundation based on first-class service to clients. They have exercised a carefully controlled plan of growth without losing sight of short and long term objectives. They are looking for men and women to join them in their systems area, who are seeking a planned long-term career.

In addition to excellent salary remuneration, the company offers free life assurance and a non-contributory pension scheme. Please contact Corinna Ingram, quoting appropriate reference no.

Senior Consultant

Applicants must have a sound commercial and business systems background. It would be an advantage to have been involved in computing, and have a knowledge of computer hardware, preferably IBM and/or minis but this is not essential. Candidates must have the ability to liaise with senior management and clients. Ref. 779.

Systems Consultant

A computer background in systems and programming is necessary, with a particular emphasis on commercial systems. Additionally, a key function will be liaison with clients, therefore, applicants must be personable and communicate well. Ref. 780.

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SALES APPOINTMENTS

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MIDLANDS BUREAU SALES EXECUTIVE (TIMESHARING SYSTEMS)

Quota earnings 10K
+ car
(Base salary 5K)

Our clients manufacture a highly competitive range of commercial mini computer systems that are fully supported by comprehensive software and engineering facilities, and growing acceptance of their products in the market place has led to an expansion of their sales force in the North West.

They are therefore seeking candidates who will be able to demonstrate a successful track record in selling small computer systems, VRCs, accounting machines or bureau services to the first time user market.

Our clients offer a high basic salary, two litre company car and the security of working for an established and well funded company.

Contact: TONY DEAN on 061-833 0676.

Ref. 77/09/14

Base 4/5K
+ quota bonus to 9K +
and company car

Our client is a market leader in network services, the fastest growing sector of the computer services industry. The company's reputation, product line and growth plans are excellent and it is well established with a Birmingham branch operation. For a prime West Midlands territory, we are retained to recruit an experienced sales professional.

Candidates should have:
* Experience of the time-sharing, bureau sales or business systems markets in a direct sales capacity.
* A definite sales personality to accompany a strong track record in selling.
* Aged 25/40.

This is the first opening with our established client in its Midlands operation, and affords an excellent opportunity for real career growth in both financial and responsibility terms.
Contact: PETER RIGBY on 021-236-3781. Ref. 77/09/15.

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We are member of the Hawker Siddeley Group, twice winners of the Queen's Award for Export achievement, and we require a Programmer to join our small systems team who are currently developing on time systems using TPS.

The ideal applicant will be a self-motivating person with experience of COBOL programming preferably on the ICL 1900 range. A knowledge of real time systems programming would be an advantage.

Applicants, male or female, should write to or telephone: Mr. R. Newton, Personnel Officer (Employment), Brush Switchgear Limited, P.O. Box 18, Felton Works, Loughborough, Leics. LE11 1HL. Telephone: Loughborough 63131 Ext. 488.

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We are looking for competent COBOL programmers with at least 2 1/2 years' experience, preferably with another language and experience of supervising other programmers.

INTERESTED in a job with challenge then why not write giving brief details of career to:

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INTERNATIONAL PROJECTS

DEVELOPMENT STAFF W. LONDON

A worldwide privately owned Company with major offices in London, is currently expanding its computer team to assist in developing a range of technically advanced applications projects.

The Company has substantial high-technology operations in some twenty-four countries throughout the world and is a major user of computer facilities. Its diverse activities lead to a considerable range of computer projects all of which are supported by keen user involvement.

The D.P. section works to highly professional standards and is continually seeking to assist user performance with the latest hardware and software developments, particularly in the areas of database and telecommunications for which formal training is given.

Vacancies exist at various levels and offer computer professionals an outstanding opportunity for career advancement.

PROJECT LEADER c £7000

To initially take responsibility for the co-ordination of a large Materials Control System using database and communications techniques. The Project Leader will hold budgeting, scheduling and implementation responsibility and play an active part in technical analysis and design. A solid computing background including supervisory experience coupled with an interest in good standards and structured programming is required. Whilst not essential, an understanding of COBOL and UNIVAC or IBM equipment would be ideal.

ANALYST/PROGRAMMERS £4250 to £6250

Analyst/Programmers at all levels will have the opportunity to play a major part in varied development projects. A flexible approach and desire to be involved in business applications offering user contact is essential. Applicants should have good COBOL experience preferably gained on large UNIVAC or IBM equipment.

Excellent conditions are enhanced by a system of flexible working hours, Non-Contributory Pension, LVs and Season Ticket Loans.

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LONDON - WEST END

Elide Ltd., part of the Unilever Group, is currently developing real-time systems for worldwide control and logistics planning using a network of eight large PDP-11 computers. These are used for IAS and RSX-11, and will be linked to each other through DECnet and also to an IBM 370/138. TOTAL is used for database management.

PROJECT MANAGER

The Project Manager will take charge of developing software required to operate the network. This is a senior position and candidates should possess:

- a background of around 5 years of software development
- in depth knowledge of both the PDP-11 and RSX-11 operating systems
- experience of project and team leadership, and the ability to command the respect of colleagues

SOFTWARE SPECIALISTS

To work within the software team both of development and implementation. Candidates should possess:

- a background of at least 2 years in software development
- at least 6 months of programming in RSX-11 operating system, preferably under a RSX-11 operating system
- a high degree of self-motivation

A substantial starting salary will be paid to software specialists, and prospects of advancement are very good.

If you would like to know more about these positions, please ring us, quoting the appropriate reference number.

 EDP Systems
Tel. 01-637 5796
52-53 Margaret Street
London W1N 1FF

SENIOR OPERATOR

Twelve hour shifts for ICL installation in West London. Two years + experience with George II and George II+.

Salary: £3500 +

OPERATOR

IBM 360/50 machine running under OS MVT HASP. Preferably two years experience for a Middlesex installation with a three shift system.

Salary: £3750

SENIOR OPERATOR

Eighteen months + experience with George III. Three shift system. ICL 1900 installation. Herts Co.

Salary: to £3800

OPERATOR

Two years + experience for Essex installation with IBM 370 running under DOS/POWER/VS. S/C and free lunches. CICS experience helpful.

Salary: £3500

IBM OPERATOR

IBM 370/125 installation in Essex require eighteen months + experience with DOS/POWER/VS. Four shift system.

Salary: £3437

SHIFT LEADER

Two shift system ICL 1904A installation. Knowledge of George II and George II+ preferably three years experience. Surrey area.

Salary: to £3800

STAFF!

LOOKING FOR JOBS?

These are just a selection of vacancies we have available. Telephone Avril Lively for more information about these and others.

01-402 0933

SHIFT LEADER

Age 20+. Three years + experience with IBM 360/50. Three shift system. Previous experience as a shift leader. OS/MVT/HASP for Middlesex company.

Salary: to £4500

ICL OPERATORS

N.W.1. Installation require operators with George II+ for a four shift system - ICL 1900.

Salary: £3000

COMPANIES!

LOOKING FOR STAFF?

Telephone Avril Lively our branch managers who will take details of the job you have available.

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IBM OPERATORS

East London company require at least eighteen months experience on IBM 370/DOS. Two shift system + perks.

Salary: £3600

ICL OPERATOR

N.W. 9 company require experience on 2903 or 2904. Two shift system. S/C allowance of eighteen months experience.

Salary: £3600

IBM OPERATORS

Up to eighteen months experience with OS/VS1. Two shift system for an Essex installation.

£c3000

DATA CONTROL CLERK

Five day week - 9-5. Bonus: To work in Data Processing department with accounts, purchase ledger, etc. Mid 20's.

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Two shift system, nine months + experience for a West One company. Federally experienced with ICL 1900 machines. L.Vs.

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HAVE YOU -

Three years + operating experience? Will you work a three shift system? Most important do you have DEC 10 experience? If so, call Avril Lively for more details.

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South of England c. £10,000 + car
A well known and successful minicomputer manufacturer has opportunities for Sales Executives to join a well established team. Candidates must have at least two years' experience of selling computer hardware in the commercial market. A background in data processing or accounting would be an advantage.
Our clients offer a high basic salary and an excellent commission scheme which will enable professional sales staff to earn in excess of £10,000.
Salaries negotiable, company car and other large company benefits.
Contact: Jim Baker

Field Service Engineers

Central London up to £5,500 + London Allowance and car
Experienced resident engineers are required for a prestige installation in Central London. The engineers must be capable of installing new equipment and systems, carrying out preventative maintenance, be conversant with diagnostic software and have the ability to communicate with customers at all levels. The successful candidates will be expected to undergo a number of weeks' formal training to achieve the level of expertise required. Experience in servicing large disc-based systems is mandatory.
An excellent salary is offered plus generous shift allowance, and overtime rates.
Contact: Margaret Stevens

Technical Authors & Engineers

Attractive opportunities in many parts of the country
Contact: Mike Craumar

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

JAMES BAKER ASSOCIATES
International Personnel Consultants
16 Maddox Street, London W.1. Tel: 01-491 4478

Technical Sales Engineers

London, H. Counties, E. Anglia on quota £7,500 + car
Opportunity to join company in DP support industry to open up new areas and further develop existing client requirements. The variety of services include industrial maintenance, humidification equipment, centralised lubrication systems, and security. Preference will be given to sales-minded Engineers who have had experience with heavy machinery and plant. Ideal for people living Herts or N. London area.
Attractive base salary and commission scheme.
Contact: Mike Creamer

COBOL Programmers

London & Berks up to £6,000
Our client, one of the leading consultancies in the country, has vacancies for programmers at all levels.
Applicants should have at least twelve months' experience for the junior positions and several years for the more senior posts. A background of COBOL in financial applications, particularly payroll, is desirable. The client can offer challenging projects in a truly professional environment.
Excellent salaries and fringe benefits.
Contact: Jim Baker

Systems Programmer

Herts to £5,500
A well established and expanding manufacturer wishes to appoint a software programmer whose main responsibility will be for the development and enhancement of executives and telecommunications software. It is essential to have a sound academic background in a scientific subject, preferably in computer science or electrical engineering and have spent at least three years working in a systems programming environment. Knowledge of a communication system would be an advantage.
Relocation expenses will be paid as necessary.
Contact: Margaret Stevens

Salary up to £10,000 p.a. or more! Systems Programmers

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You could hear something to your advantage**

IDEC, the Design and Development Centre of ITT Business Systems and Communications Group is responsible for the major software development activities of the new products marketed by this worldwide group.

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● 'State of the Art' Software developments in:

- Real Time
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We are only looking for the *best* software professionals, people dedicated to improving the software development process and expecting to be justly rewarded for it.

It might surprise you to find out just how much we value your software expertise.

We'd like to tell you more about the opportunities currently existing within IDEC. Why not come along and talk to us over a drink!

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Mr. J. Healey, Personnel Manager,
IDEC, Canada Life House,
Potters Bar, Herts.

Come along to:
**Canada Life House
High Street
Potters Bar, Herts.**
on Tuesday September 27th
or Wednesday September 28th
between 12 noon and 9.30 pm.

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Department of Roads**RESIDENT
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Post No. GW/RES/80/1, Grade A.P.V. £4548-£4988 + supplement of £320 per annum.

Located at Strathclyde Computer Traffic Control Centre, Glasgow.

Research into area traffic control by computer is undertaken in Glasgow by the Transport and Road Research Laboratory through an arrangement with the Regional Council's Director of Roads. At present 50 junctions in the city centre are controlled by computer, and a feasibility study is under way to assess the city's future requirements for control of traffic by computer.

The current responsibilities of the Resident Engineer at the centre are as follows:

- a) Research into on-line and off-line methods of traffic control in association with the TRRL. This includes contributing to specific research projects, assistance with large scale journey time surveys and with setting up experiments in Glasgow.
- b) Programming the on-line computer system for research work and updating the existing operating system.
- c) Ensuring that the computer system and the traffic on the street network within the city centre are running efficiently.

Candidates must have a degree in civil electrical or electronic engineering. Experience in area traffic control systems and/or traffic management is desirable but not essential. Application forms may be obtained from the Assistant Director at Maproom Services, 21 Danden Street, Glasgow G1 3PS, to whom completed forms should be returned by 14th October 1977.

R. M. O. McILLOCH
Director of Manpower Services

Senior Systems Analyst
£5847-£6532 inc.

An opportunity in the project team for an experienced systems analyst to work on payments and housing systems. Responsible to Project Leader for analysis, design, implementation and maintenance of systems, and for adherence to work targets. Applicants (prof. under 40) must have min. 3 years' computer systems experience and have completed on target at least one major system. Must be able to lead a team of 3 to 8 staff. The Authority operates under George 3, a 140C 1803T with FOSBOS, last topics, 7502 terminals, and has a wide-ranging development programme of on-line and batch applications. 35 hr. week (flexible hours), 28 days' annual leave plus 8 statutory days. Written applications by 28 September to: Computer Services Manager, Town Hall, London SW1S 2PU

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Wandsworth**Systems Consultants**
£6,000-£9,500

CENTRAL LONDON

Seven large well-established consultancies wish to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require a first rate service. Technical communications consultants are also required where in-depth implementation experience of IBM or ICL T/P message switching networks etc., are essential. Excellent fringe benefits and prospects.
CW 38/1 Michael

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£2,000-£4,000 (incl.)
LONDON & HOME COUNTIES

We have many vacancies covering all types of machines and locations. Some firms will refrain from one manufacturer to another. Remember these positions are for shift-working only. Hurry whilst stocks last.
CW 38/2 Annette

Junior Programmers
£2,500-£3,750

LONDON, HOME COUNTIES

Only one year's experience? Then you are in great demand. We have a large selection of first-rate companies who need people like you.
CW 38/3 Annette



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Contract Programmers
to £190 p.w.

U.K.

Immediate requirements for IBM COBOL under DOS or OS for C. London, FL/1, OS or CICS, PDF/11 or good IMS for various locations for 3 months plus. Also IBM vacancies in GERMANY, FRANCE, BELGIUM & HOLLAND. Ask for the Contracts Officer on 01-995 2238.
CW 38/4 Michael

Time Sharing Programmers
to £6,000

C. LONDON

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CW 38/5 Michael

Successful Salesmen
to £12K quota earnings

U.K.

We now have ten different firms for both hardware and systems only companies who are anxious to meet successful salesmen in this industry. They must have previous relevant small systems experience (some VRs will be considered). All firms have bonus schemes and cars or car allowance. Most positions in S.E. England, but 2 in Midlands.
CW 38/6 Michael

Mini Computer Programmers
to £6,950

U.K.

Your experience is required now. A very large number of vacancies are registered where a knowledge of assembler or communications experience is essential (VRC programmers would also be considered). Opportunities exist in S.W., N.W. or W. London, Surrey, Herts and Manchester in this exciting and rewarding field. There has also been registered some overseas posts to people with 5 or more years in mini computers.
CW 38/7 Michael

AUSTRALIA

N.R.M.A. is the Motorists' organisation for N.S.W. and has 1.2 million members. As well as the provision of the usual motorist services, our operations include Insurance, Finance, Travel and other motorist-related activities. Our Data Processing Section is located in a modern, air-conditioned building in the centre of Sydney. We require:

SENIOR SYSTEMS PROGRAMMER

with considerable experience in teleprocessing networks and CICS. Salary around A\$16,000.

SYSTEMS PROGRAMMER

with experience in any of the following — DOS/VS, VM, CICS, DLI. Salary around A\$14,000.

PROGRAMMERS

who will possess considerable experience in COBOL and/or Assembler, preferably on IBM 370 computers, and who are the choice of being trained for systems programming or doing the applications programming group with a career path to systems analysis. Salary to A\$13,000.

Suitably qualified applicants with a genuine interest in emigrating to Australia should write, giving a telephone number at which they can be contacted during business hours and including full details of education, employment history and references, to:

JOHN GOSNEY
43 UPLANDS CRESCENT
FAREHAM, HAMPSHIRE

by 10 October, 1977. Interviews will be held in London in the week ending 11 November, 1977. Applicants are advised to apply for immigration to New South Wales before 30 September. 3 years' practical experience, plus suitable qualifications.

H.P.S.L. H.P.S.L.

**SWEDEN
FREELANCE
PROGRAMMERS
IBM COBOL/ASSEMBLER**

with HOME WELL TRAVEL, etc. etc.
Currently required for contract work in Sweden.
Tot. Amersham (02403) 22201

H.P.S.L.

JBA

Systems Programmer

London-Essex border circa £5750

A well known manufacturing company have an excellent opportunity for an experienced Systems Programmer with an IBM 370 DOS background and, ideally, knowledge of SHADOW and DBOMP. The position will involve responsibility for the entire software of the installation, dealing with all levels within the DP department, and liaising with outside suppliers of hardware and software.

Applicants must have had formal training as a programmer and of operating systems and TP monitors. They must be self-motivated, capable of working without supervision, and have high organisational abilities. The work will particularly suit someone with imaginative and inventive skills.

Company prospects, relocation package and general benefits are excellent, together with regular status and salary reviews.

Contact: Mike Creamer,
James Baker Associates,
International Personnel Consultants,
16 Maddox Street,
London, W1.
Tel: 01-491 4478.

COUNTY DURHAM

SYSTEMS ANALYSTS/ PROJECT LEADERS

Salaries in a range to £8,500

You may be called a Systems Analyst, Senior Analyst or Project Leader, but have you the ability and experience to play a responsible role in our clients programme of challenging systems development? You should have designed and implemented at least one major system showing positive achievements in the production or stock control areas, and have the ability to communicate, and motivate others. A programming background and ICL TP experience will be advantageous, particularly for the junior positions.

In return for your skills our client offers:

- * a highly competitive salary
- * the chance to develop a new Production Control systems, using on-line systems techniques
- * excellent conditions of employment, including 5 weeks holiday
- * a first class relocation package to an attractive part of the Country, within reach of the North Yorkshire Dales and Northumbria.

CONTACT TONY DEANE

ADVISING CONSULTANT 061-833 0676

REF. NO. 77/09/24

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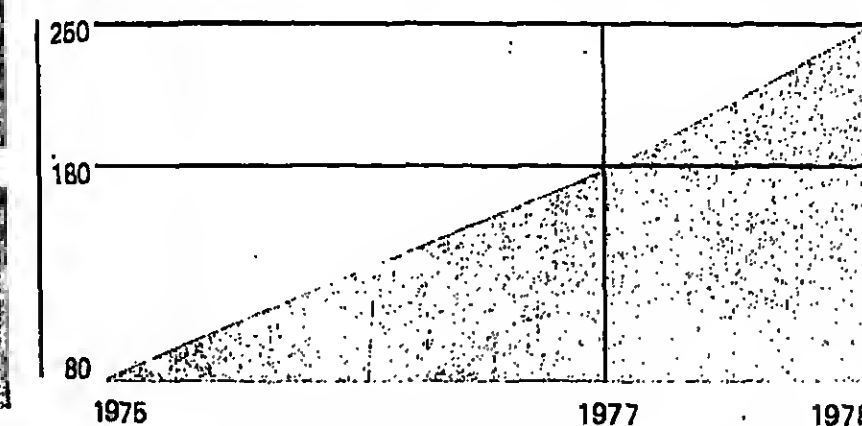
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Computing Services Association

SCR

More! Still more!

We're growing as fast as ever in all aspects of our business. That means we need to continue expanding our Management Services Department based at Littlewoods headquarters in Liverpool. The Department already houses Europe's most ambitious Honeywell installation — plenty of ambitious computer professionals too. The graph shows how our programming and systems staff has increased to date, and how we intend it to grow in the next few years: years providing unrivalled career opportunities for computer people with the right experience.



To keep pace with this expansion we're busy setting up a complete, fully-equipped, in-company training school. That's how important computer development is to us. But in the meantime we need experienced computer people NOW. Since our successful recruiting drive earlier this year even more opportunities have arisen for the following staff:

Systems Analysts

Programmers

Data Base Analysts

Software Specialists

Communications/ Mini Specialists

If you're in one of these categories and you're keen to develop your career, there are three good reasons for doing it with Littlewoods.

(1) **THE WORK:** You'll be using the latest in advanced hardware (three Honeywell 88/80 processors 788K; thirty-two 200mb disk drives; sixteen tape drives; four line printers, and four Datanat communication processors, with 800 VDU's on line) and tackling a variety of interesting projects (real time order processing, merchandising, payments and warehouse control for six mail order companies; stock allocation and real time food distribution for 105 chain

stores; plus the payroll and reporting services essential for an organisation 35,000 strong).

(2) **THE SALARY AND PROSPECTS:** You'll earn a very competitive salary with good fringe benefits and excellent career prospects within a successful and expanding organisation. (You'll be pleasantly surprised by local house prices too.)

(3) **THE SATISFACTION:** Satisfaction that comes from involvement in absorbing and stimulating projects which make a genuine contribution to the company's profitability.

These are opportunities no career-minded computer professional can afford to ignore. For further details just call in for an informal chat, with no obligations, at one of the venues listed opposite.

Greater London

HOUNSLOW	MONDAY 28 SEPTEMBER	12 noon - 9 p.m. Littlewoods store Hounslow Centre, High Street.
CROYDON	TUESDAY 27 SEPTEMBER	12 noon - 9 p.m. Littlewoods store, 5-9 North End.
WEMBLEY	WEDNESDAY 28 SEPTEMBER	12 noon - 9 p.m. London Esso Motel, Empire Way.
CENTRAL LONDON	THURSDAY 28 SEPTEMBER	12 noon - 9 p.m. White House Hotel Albany Street, N.W.1.
HENDON	FRIDAY 30 SEPTEMBER	12 noon - 9 p.m. Hendon Hall Hotel, Ashley Lane, N.W.4.

North

EDINBURGH	MONDAY 26 SEPTEMBER	12 noon - 9 p.m. Littlewoods store, 80-81 Princes Street.
NEWCASTLE	TUESDAY 27 SEPTEMBER	12 noon - 9 p.m. Littlewoods store, 42 Northumberland St.
MIDDLESBROUGH	WEDNESDAY 28 SEPTEMBER	12 noon - 9 p.m. Littlewoods store, 92-94 Linthorpe Road.
LEEDS	THURSDAY 29 SEPTEMBER	12 noon - 9 p.m. Littlewoods store, Briggate/Kirkgate.
MANCHESTER	FRIDAY 30 SEPTEMBER	12 noon - 9 p.m. Midland Hotel, Peter Street
LIVERPOOL	MON-FRI 26-30 SEPTEMBER	12 noon - 9 p.m. Littlewoods Management Services Training Centre, 2nd Floor, Spinney House, Church Street.

Midlands

NOTTINGHAM	MONDAY 28 SEPTEMBER	12 noon - 9 p.m. Littlewoods store, 6-12 Long Row, Off Old Market Square.
LEICESTER	TUESDAY 27 SEPTEMBER	12 noon - 9 p.m. Littlewoods store, 6 Humberstone Gate.
COVENTRY	WEDNESDAY 28 SEPTEMBER	12 noon - 9 p.m. Hotel Leofric, Broadgate.
BIRMINGHAM	THURSDAY 29 SEPTEMBER	12 noon - 9 p.m. Littlewoods store, 67-68 High Street.
WOLVERHAMPTON	FRIDAY 30 SEPTEMBER	12 noon - 9 p.m. Littlewoods store, 4 Wulfrun Square.

If you can't make it on any of these dates, write with brief details of your age, education and experience to date to: Linda Reeves, Management Appointments Department, Littlewoods, JM Centre, Old Hall Street, Liverpool X, OR telephone 061-236 8516 (24-hour Answerphone) for an application form.

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Leaders in computer-based retailing



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SENIOR COMPUTER OPERATORS

Promotion and development have created opportunities in Key Markets' Computer operations for 2 Senior Operators to work on DAYS AND EVENINGS ONLY. The installation is an IBM 370/135 (OOS/VS: POWER/VS: CICS/VS).

Progressive development and transfer of the company's systems on to the 370 has created an absorbing and varied working environment which is spacious and a totally new establishment.

Key Markets is member of the Fitch Lovell Group) is a leading food retailer with a turnover in excess of £100 million and offers 4 weeks' holiday, Pension Scheme, staff restaurant. We are located near Hainault Underground (Central Line) station.

Please telephone or write to:
MRS. P. SOUTHGATE, PERSONNEL OFFICER
KEY MARKETS LIMITED
320 NEW NORTH ROAD
HAINAULT, ILFORD, ESSEX
Tel: 01-800 1080 or 8114

DP MANAGER (DESIGNATE)

Up to £5000 PA

This is an excellent opportunity for an experienced Computer Programmer/Systems Analyst looking to advance into DP management with a well-established manufacturing company based in the rural South West Midlands.

Data Processing systems are well established but there is ample scope for additional development.

You should have at least 5 years' experience in computer programming and/or systems analysis. Experience in RPG II and/or IBM System 3 equipment would be an advantage. Age 28+. Relocation expenses will be paid as required.

Contact: Ian Fyfe on 021-236 5971
PER Divisional Office, Fountain Court
Steelhouse Lane, Birmingham B4 6BB

PER PROFESSIONAL and EXECUTIVE RECRUITMENT

This vacancy is open to male and female applicants

Senior Programmer

Manchester Area. c. £4,000 p.a.

Our client wishes to appoint a Senior Programmer with COBOL experience. The successful candidate, male or female, will be involved with the development of on-line systems using ICL 1900 Hardware.

The position offers excellent career potential with training in communications based systems. A competitive salary, around £4,000, will be paid according to experience.

This Company, part of an international Group, offers excellent working conditions and benefits are those normally associated with a progressive organisation.

Please write with full career details listing any companies to whom you do not wish your application sent and quoting reference number 525 to:

Riley Management Selection (Services) Limited,
Queens Chambers, 5 John Dalton Street, Manchester M2 6ET.
A member of the Rex Stewart Group.

LONDON BIRMINGHAM BRISTOL EDINBURGH GLASGOW
LIVERPOOL MANCHESTER NEWCASTLE NOTTINGHAM

ENGINEERING BUREAU—TIMESHARING ACCOUNT MANAGER—SALES MANAGER DESIGNATE UK—NORTH LONDON BASE

SALARY £8,000 + CAR
POTENTIAL INCOME £10,000 — QUOTA TARGET £38,000

The company is part of a large international organisation with a sound reputation in the computer services industry.

They are to expand the engineering services division and are looking for a sales professional with a background of computing and previous experience in areas such as petrochemicals, electronics, network analysis, piping, stress engineering etc.

A qualification in engineering would be an advantage.

Please immediately for a discussion and to arrange an appointment quoting reference CW182.



Insight Marketing & Personnel
Consultants Ltd.
72-75 Merybone High Street
London W1M 4AJ
Telephone: 01-486 5644

SENIOR SYSTEMS ANALYST

LONDON W.1. £6250/£6750

This is an opportunity to take a key role in the development of information systems — real time, database and batch processing.

Responsibilities will include:

- feasibility studies and outline systems proposals
- associated cost and resource estimates, implementation plans etc.
- assistance in the evaluation and procurement of hardware
- presentations to users

This career opening will interest Senior Analysts with:

- both on-line and off-line experience knowledge of communications equipment, terminals, and complex data processing would be valuable but is not essential
- enthusiasm and the ability to implement practical theory in novel applications
- upwards of five years' data processing background, including significant periods as a systems analyst or designer

The environment offers the opportunity to work to good standards and to develop knowledge of sophisticated techniques. Training will be given where appropriate. No travel is required.

We have been retained by clients to advise on this career opening. Please ring us for a confidential initial discussion quoting ref. 672, or write briefly.

EDP Systems
52-53 Margaret Street
London W1M 7FF
Tel: 01-637 5796

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FORTYAN
Experienced and
Trainee Programmers
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For ten years COMPUTECH has been finding better jobs for people in the computer field. Since April this year we have been keeping our extensive registers online in our own disc based state of the art micro computer system.

The personal touch has been maintained but our consultants now have a powerful means of rapid search at their fingertips and under their control for locating the best job for YOU!

REGISTER NOW!

COMPUTECH 01-794 0202

To £8,000 SYSTEMS ANALYST Enfield
The successful applicant for this job should have had at least three years systems experience and be familiar with several different mainframes. The person appointed will have the opportunity to play an important part in the development of new systems and application of new techniques.

To £5,500 PROGRAMMERS Enfield
The same client is also looking for programmers with experience of any or all of ICL COBOL, PL/I, IBM COBOL and BAL. Experience of eighteen months and upwards considered.

COMPUTECH 01-794 0202

£8,000+ SALESPEROPLE Midlands
Our client requires experienced people, either with a sales or engineering background, to sell mini computer interface and peripheral equipment. Basic salary to £5,000 plus commission plus car.

£3,000+ Several areas
A manufacturer of a wide range of computers and peripherals requires graduates or others with proven sales experience, aged between 25 and 30 years.

COMPUTECH 01-794 0202

To £5K SENIOR PROGRAMMER Huntingdon
This requirement is for a senior person with really good experience of IBM COBOL usage under OS/VS.

£neg ASSEMBLER PROGRAMMER Barks
We are looking for assembler level programmers for a software and systems house. Our client would consider retraining COBOL programmers to work with mini and micro systems. We have a number of clients in different areas seeking experienced assembler programmers.

COMPUTECH 01-794 0202

INCREASE YOUR OPPORTUNITIES!
We have hundreds of unadvertised vacancies in our database but we need to register you so that we can offer you the selection to match your particular needs. When our clients contact us with some special requirement for which you have the experience your name will come up if you are registered with us. Can you afford not to be?

COMPUTECH SYSTEMS & PERSONNEL
188 Finchley Road, London, NW3 8HP

COMPUTECH 01-794 0202

To £7,000 PROJECT LEADER London, EC
Our client is an international bank and requires an able Systems Analyst with a COBOL programming background. This is an IBM installation but OEC experience will be an asset.

£4,500-£5,500 SYSTEMS ANALYST Hants
Major oil company - IBM 370.

£3,500-£5,000+ ANALYST PROGRAMMER Hants/Dorset
RPG 2 preferred, COBOL, PL/I considered.

COMPUTECH 01-794 0202

COMPUTER SYSTEMS TEST ENGINEERS

Cable and Wireless, a leader in global telecommunications, require Computer Systems Test Engineers to work in their Southwark offices.

The Job

You will commission/system test message switching systems, using P.D.P.8 mini-computers and multiplex equipment manufactured in-house. A thorough knowledge of P.O.P.8, mini-computer technology is a prime requirement.

Your Experience

At least two years mini-computer experience, some system design experience, and ideally some software programming experience.

Your Qualifications

An H.N.C. in electronics or equivalent.

Salary

Would be commensurate with age and experience, plus the benefits usually associated with a worldwide organisation.

For an application form, please contact:

Miss C. Morgan
Cable & Wireless Limited
114 Great Suffolk Street,
London SE1 0SG
Tel: 01-288 1901 Ext. 236

Cable & Wireless

SYSTEMS ANALYST c. £5,000

Commercial organisation with ICL 1901T, EDS 80's and VDU's is shortly embarking on an exciting development phase and seeks applicants for the above post.

You will have a fair amount of commercial systems experience together with a Cobol programming background. The position also entails deputising for the DPM in his absence.

Application forms will not be used so please communicate concise relevant details to: C. G. Lester, Finlay & Co. Ltd., Collingwood House, Mercers Road, London N19 4PL. 01-272 2081.

Programmers to £5,000

ESSEX
An expanding Insurance Company with ability to give Mortgage assistance and working Flex-time requires 2 Programmers with COBOL or ASSEMBLER experience on IBM or similar manufacturer. 4 weeks holiday and reduced costs in insurance. CW38/8 Annetts.

Programmers £5,000

ENFIELD/BERMINGHAM
Five COBOL programmers, preferably with large machine experience, are urgently required by this medium sized with-it service bureau having H88 equipment for both their Enfield and Birmingham offices. Flexitime, subsidised canteen and 4 weeks holiday. CW38/8 Annetts.

Programmer £5,500

MID SURRY
Would you like to increase your knowledge or learn about OL/I and CICS? Then all you need is good PL/I programming experience to join this progressive manufacturing organisation. Benefits include 4 weeks holiday, NCB, free life insurance and a very active sports and social club. CW38/10 Annetts.

Senior Programmer to £5,500

CITY
A profitable Service Bureau of long standing has need of a D.E.C. programmer with on-line and PDP RSTS experience using BASIC. There is an opportunity to grow with a growing firm. CW38/11 Mitchell.

Programmer £5,000 to £6,500 W. LONDON

A famous International Petro-Chemical organisation using a Univac 1108 requires commercial programmer with COBOL EXEC 8 experience. Excellent large company perks, long holiday, and very good promotional prospects. CW38/12 Annetts.

Senior Systems Analyst Application Programmers £4,000-£6,000 +

NEAR HERTFORD
A large commercial company with big computer plans is about to design a new complex integrated transaction system. They require COBOL oriented people with financial or production control experience. Perks include discount on goods and subsidised canteen. CW38/13 Annetts.

Systems Analyst and Analyst Programmers £5,000-£7,500

S.W. LONDON
An international Insurance company with major expansion projects under way is looking for staff at all levels. The senior applicants must have insurance experience and the programming staff must know IBM COBOL OOS/VS. Free life insurance, 3 weeks' holidays, etc. A really exciting opportunity for the right people. CW38/14 Annetts.

Systems Analyst to £6,500

S.W. LONDON
A major food group situated in S.W. London is engaged on a new expansion of its computer systems department. Commercial analysts (preferably with on-line experience) are requested to apply for this really exciting position. Excellent prospects. CW38/15 Annetts.

Senior Systems Analyst c. £5,500 NR. STAINES

If you have ICL financial and commercial systems experience and like to be in charge, then this position could be for you. The firm is part of a large manufacturing group with a secure future. CW38/16 Annetts.

COBOL COMPUTER PROGRAMMING INSTRUCTOR

required in London W.1.
Monday and Wednesday
evening each week, 6 pm
to 9 pm. If you have the
desire to teach please
phone me now.

Steve Groose
01-482 1841

COBOL PROGRAMMERS

£180-£250 per week
Short or long term

01-302-9355

Operations Supervisor COMPUTER BRANCH

LEEOS

Applications are invited from men and women for the above position, based at 8acca Hall, Aberford, which is ten miles east of Leeds.
The computer installation comprises an ICL 1903T - 1904 store, operating under GEORGE 3 system with EDS 80C 180 KCS MTUs, plus an ICL 7905 acting as an interface with the IBM 370 configuration at the Board's Headquarters in London.

The Operations Supervisor will be responsible to the Operations Controller for the co-ordination and management of the Operations and Job Assembly Sections, the provision of an efficient processing service for all user departments and the operation of a developing terminal network. Applicants should have had experience in Computer Operations in a senior capacity and be capable of supervising staff.

Experience of an operating system, preferably GEORGE 3, Terminal Network, and the ability to plan and schedule a large machine with a tight timetable, would be a distinct advantage.

The person appointed will have to provide his own transport.

The salary will be within a range of £4,000 to £6,000 p.a. annum.

Point of entry will depend upon experience and qualifications.

Applications in writing, giving details of age, experience, qualifications, present position and salary, should be forwarded to the Regional Personnel Manager, Central Electricity Generating Board, North Eastern Region, P.O. Box 177, Meriton Centre, Leeds LS1 1RL to arrive not later than Monday 3 October 1977, quoting reference SVN 571/CW.

QRH COMPUTER RECRUITMENT PROJECT LEADERS: TO £6000

Our Sister Company, QRH Software Ltd., are seeking a number of Applications specialists who have the ability and motivation to make a significant contribution to the Company growth. The persons appointed will not only be technically competent but will be able to function in an advisory capacity in a Pre-Sales Environment.

The standards that we set are extremely high, as befits a Professional Company, but so are the rewards.

We require people with extensive applications experience in the general commercial area's especially Manufacturing Systems, Order Processing, Stock Control and General Accounting. Probably just as important as technical expertise is the kind of personality that can get the best possible results from the Project Teams they will control.

With a current growth rate of 200% we are looking for people with the ability to grow with the job and the Company, so if you are stretched in your current position, you will not make it with us.

If you have good applications experience with Man Management thrown in and experience of Mini Computers, typically Burroughs B700/880/B1700, Dec System, Singer 10, 2003, System 32/34, NCR Century 75/100, and believe that hard work will only bring progression, not old age, then it's about time we got together.

Write, telephone or call in to
C. R. Courtney-Stones - Executive Director
QRH COMPUTER RECRUITMENT
Queens Road Mills, Halfpenny HX1 4LR
Tel. Hx. (0422) 86232

LOLA

now has vacancies for the following staff to work on one of the largest and most advanced local government computer installations. Current equipment is a 2-megabyte IBM 370/158. On-line teleprocessing/databases systems have been developed and are continuing to be expanded.

Programmers £4161-£5346 incl.

Minimum 2 years' programming experience with at least 1 year's PL/I. Experience of working in a teleprocessing database environment would be an added advantage.

Junior Programmers £2860-£4073 incl.

Minimum 6 months' programming experience and 'A' level qualifications. Training in PL/I given if necessary.

Operators From £4200 incl.

Experience of OS/VS1 (or comparable operating system). Applicants should have been educated to "A" level standard and preference will be given to those with at least 4 "O" levels including Maths. Availability for 3-shift working essential.

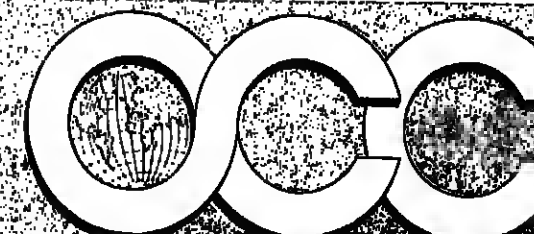
Further details and application form from:
Mrs B. Dorrington
LOLA

Tower Point North
Sydney Road
Enfield, Middx. EN2 8UE
Tel: 01-388 8811 (ext. 278)
(Closing date for returned applications 10.10.77)

ANGLIAN D.P. SERVICES LTD formerly ANGLIAN COMPUTER SERVICES

Programmer (RPGII) Suffolk - £Neg.
Prof. Leader (IBM 370) Essex - £6,000
Analysts (IBM 370) Essex - £5,500
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Analyst Programmer (IBM) Suffolk - £Neg.
Sen. Programmer (IBM 360) Essex - £5,000

Phone: Danbury 4255 (STD 024541)
or write ANGLIAN D.P. SERVICES LTD
Surrey House, Maldon Road
Danbury, Chelmsford CM3 4QW.



occ computer personnel limited

● Surrey

RPG Consultant Programmer

£5,000 - £7,000

Our client is a Software House operating in the U.K. and overseas. Opportunities for permanent employment, based in London or Reading, can offer a variety of locations as well as a wide selection of projects on different types of hardware such as ICL 2903/4 and ICL 2980/70.

There is a vacancy for a Senior Programmer with a sound knowledge of RPG. The first assignment will be on 8 months' project in Surrey on a 2903 installation. The project will deal with commercial account systems and the programming language will be RPG II. A knowledge of 2903 RPG II would be an obvious advantage.

Alternatively, the vacancy could be filled by a more senior candidate who could offer, in addition to the above requirements, other valuable experience and could take Project Management responsibilities on future projects. A background in Software, Design and/or Operating Systems support. Real Time Systems implementation on mainframes or minis would be very attractive.

PROJECT LEADERS with ICL SYSTEM TEN (SINGER 10) experience are also invited to apply. Salaries in excess of the maximum quoted are negotiable for candidates with exceptionally good experience.
Ref.: 571/CW/Rene Nuta

● Middle East

Univac based systems, major development projects

Requirements in the Middle East generate an urgent need for the following personnel.

Data Base Designer

c.£30,000 tax free

Main responsibility will be in the area of logical data base design and implementation, including technical advice and guidance in this area. Previous experience must include Data Base design, ideally using Univac OMS although similar experience on other hardware could be of interest.

Operating Systems Specialists

c.£30,000 tax free

Responsibilities will include both consultancy and direct involvement in the generation and enhancement of the Exec 8 operating system and related software. Candidates must be technically competent and thoroughly familiar with this software. Positions will be offered on a renewable contract basis with initial periods of at least 12 months. Single candidates, or those married with no schooling commitments, are preferred.

Ref.: 351UM/CW/Roger Allington

To apply for any of the above positions or for further information, please telephone or write to the Consultant concerned on 01-242 9356. If it would be more convenient to telephone in the evening, the telephone numbers are:
Neville John - Farnborough (Kent) (66) 52017. Roger Allington - Barchemsted (04427) 2299. Rene Nuta, 01-874 6372. Sharon Matthews, Billerica (02774) 22351.

● London

Systems Consultants

£6,000 - £8,000

Computer Systems Audit, Training and Systems Consultancy for major firm of Chartered Accountants

A major firm of Chartered Accountants offers a specialised service to deal with the problems of auditing and financial control arising from the use of computer based systems. A number of the firm's young CAs are trained each year in systems analysis and computer techniques and then work on the study, assessment, etc., of individual cases. These CA/systems analysts are trained and advised on their assignments by experienced computer systems analysts. A further two such people are now required. The work involves specific consultancy assignments, as well as training.

Candidates must have varied computer experience (7-10 years) including programming; all aspects of systems analysis, design and implementation; experience of on-line systems and telecommunications; a knowledge of hardware and software; a knowledge of related disciplines such as OR, economics and so on. Candidates need an excellent command of English and must be systems minded. A job specification is available to suitable candidates.

Ref.: 717/CW/Neville John

● Far East Contracts

c.£700 pm (tax free)
+ accom.

Our client provides DP Consultancy and Education Services in the Far East and Australia. They currently have urgent requirements for contract staff in the following areas:

Training - IBM Systems Appreciation and Design

The job will involve the compilation and running of short courses for technical personnel in the design and implementation of IBM based systems, from an application viewpoint. Candidates should therefore have a broad IBM background covering systems analysis and preferably both applications and systems programming, e.g. OS, VSAM, CICS, IMS, COBOL, Assembler, together with an interest in training. Initial contract 6 months, starting mid-October.

Training - PL/I

An experienced PL/I programmer is required in Singapore to provide PL/I training to foreign nationals. Initial contract 3 months, starting end of October.

Ref.: 446B/CW/Sharon Matthews

DL1/COBOL Programmers

Two programmers are urgently required to work on an IMS project in Brunei. Candidates should have good DL1 and COBOL experience, and preferably a knowledge of Merk IV. Initial 6 month contracts, to start e.s.a.p.

Ref.: 446C/CW/Sharon Matthews

Members of
Computing
Services
Association

CERN European Organization for Nuclear Research Organisation Européenne pour la Recherche Nucléaire

CERN, a European Research Laboratory situated near Geneva, has vacancies for:

COMPUTER CONSOLE OPERATORS

In the central computer service, this is at present based upon CDC 7600, 6600, 6400 computers and an IBM 370/158 system.

The posts involve shift work including weekends and public holidays.

Candidates should have successfully completed their education to at least 'O' level, or equivalent, preferably including mathematics, science or other scientific subjects. At least two years experience of computer operation including some IBM experience is desirable. A knowledge of French would be useful.

For application forms, please write to:
Head of Personnel, CERN, 1231 Glands, CH, Switzerland.
During the reference period: DD-CO-77/1

Definitive

THE UNIVERSITY OF LIVERPOOL Computer Officer

Applications are invited for the post of Computer Officer in the Computer Laboratory. A good honours degree is essential and preferably a postgraduate qualification. Experience in the following is of special interest: data base management, microprocessors, computer networks, interactive graphics.

Initial salary will be within the range £2,904-£3,781 per annum on a scale rising to £5,627 per annum.

Applications, together with the names of three referees, should be received not later than 14th October, 1977, by the Registrar, The University, P.O. Box 147, Liverpool, L69 3BX, from whom further particulars may be obtained. Quote Ref: RV/653/CW.

GREATER GLASGOW HEALTH BOARD Computer Programmer

Grade 1
Salary Scale: £153-£4038 (inclusive of Phase I and II)

Applications are invited from Programmers with a minimum of one year's practical experience programming in Cobol. A background in any of the following would be an advantage:

- 1) Financial or Administrative Applications
 - 2) Knowledge of ICL equipment
 - 3) Knowledge of Fileaid or FTIL
- Applications form and further details may be obtained from the Personnel Officer, Greater Glasgow Health Board, 351 Sauchiehall Street, Glasgow G2 3HT, to whom completed forms should be returned no later than Monday, 3 October, 1977.

Programmers and Programmer/Analysts —there's a world of difference at ISL

A lot of the difference is centred around our international role. IBM Information Services Limited helps IBM's business run smoothly in over 20 countries, backed by a large System/370 installation, and a complex international information network linking over 2,000 user terminals.

As one of our Programmers or Programmer/Analysts you'd be at the heart of this operation—in contact with overseas IBM locations, helping design, develop, install and maintain international applications systems and on occasions travelling abroad to meet and help your colleagues on the spot.

It's an important job, presenting a considerable challenge to your initiative and creative programming abilities.

And it offers plenty of room for progress. As your career develops, you'll be able to move around within the company, broadening your experience, strengthening your expertise.

Here's what we're looking for: young programmers and analysts, male and female, with a



minimum of a years' experience in a commercial DP environment. A high-level language, such as PL/I, plus experience of OS/IMS or tele-processing would be ideal, but isn't essential. We also offer first class training for aspiring DP professionals and we'd be particularly interested in hearing from recent graduates.

We offer generous relocation expenses to our new headquarters in this attractive part of the South Coast, which has outstanding recreational and social facilities. Salaries are very competitive and IBM's employee benefits package is acknowledged to be one of the best in industry today. Interested? Then write now with full details about yourself to John Mann, Personnel Officer, IBM Information Services Limited, PO Box 39, North Harbour, Portsmouth PO6 3AA quoting ref: CW/83244

IBM
Information Services Limited

HERTS AND NORTH LONDON

We specialise in D.P. recruitment for clients in Herts and North London and the following vacancies are taken from our current register:

ENFIELD (i)

An experienced Systems Analyst with an IBM System 3 or ICL 2903 background is required by retail but professional installation currently engaged in company accounting projects. (Circ £5,000).

ENFIELD (ii)

The Management Services Group of a large and complex ICL user has vacancies for Systems Analysts (up to £5,000), Senior Programmers (up to £5,500) and Programmers (up to £4,800) to assist in the development of a range of T.P. and batch applications. Hardware will shortly include an ICL 2870 planning for which is well under way.

ENFIELD (iii)

A growing company located in modern offices requires an experienced Cobol Programmer (2 years, any machine) for their ICL 2803. A salary of £4,500+ is offered plus an opportunity to move into systems analysis at an early stage if desired.

BARNET

Situated just north of Barnet, small, friendly IBM 370/125 installation has a vacancy for a Programmer/Analyst or Programmer with at least 2 years' IBM Cobol experience. (£4,500+).

FINCHLEY

Electrical Instrument manufacturer is seeking a Senior Systems Analyst up to £5,545 to play a leading role in the development of four major real-time systems for their new ICL 2850. Applicants need have no previous real-time experience.

WALTHAM CROSS

One of the leading rental groups in U.K. known for its progressive management offers a dynamic but structured career in its ICL 1904S/VDU based computer division. Applications are invited from Analysts up to £5,200, Analysts/Programmers and Cobol Programmers, not necessarily ICL up to £4,862.

For more information on these and many other vacancies ring

HAYMARKET COMPUTING LIMITED. Tel. CUFFLEY (HERTS) 4130
(UP TO 7.00 p.m.)



Operations Manager — Bermuda

London Interviews Next Week

SDI, the creators of GRASP (VS), EPAT and FLEET have a vacancy for an OPERATIONS MANAGER at their research centre in HAMILTON, BERMUDA, where an IBM 370/135 is installed.

The requirement qualifications are:

- * Prior experience as Operations Manager of a DOS or DOS/VS installation.
- * Prior experience with at least our GRASP or GRASPVs product.
- * Ability to control a disciplined, security oriented, computer room environment.
- * Previous systems programming or operational support experience so to be able to control our installation's software systems generation and maintenance.

Bermuda is a conservative British Colony in the Mid-Atlantic. Less than two hours from New York. It has a pleasant climate and stable government. Salaries are paid in US Dollars and there is no income tax. SDI will assist in obtaining work.

Permits for successful applicants. A relocation allowance will be paid.

Applications from Bermudians especially welcome.

To apply for this position or obtain further information please telephone Brenda Anderson. 01-736 1382.

SDI

PDP 11 Programmers

we're talking your language
in Manchester

Your PDP11 programming experience and our advanced software developments in Computer Aided Design—put them together and you've got a career opening that spells job interest, and really challenging work in a stimulating environment. At Ferranti Semiconductors in Manchester we are strengthening our C.A.D. facilities and need programmers, ideally with a degree and some useful experience either in PDP11 machine code programming or scientific programming.

Salaries are negotiable and there's the 'big company' benefits and sensible house prices of the Manchester area to attract you—start right now and send brief details of your qualifications and experience, in the first instance, to: T. J. Lunt, Staff Manager, Ferranti Limited, Hollinwood, Lancs. OL9 7JS quoting reference FRR/2/CW

FERRANTI

Chief Programmer

£6000

This is an opportunity for a professional in a major manufacturing company with a large capital investment programme which depends on effective data processing. Initially using terminal links to the Group Headquarters' 370/158 computers operating on OS/VS, the Chief Programmer, reporting to the Management Services Manager, will build on existing IMS Data Base programs which will provide crucial management information. A major original contribution is necessary in the establishment of the highest possible standards and the building of a team. Considerable independence of action will be given to the person appointed.

Big company Cobol experience is essential. The requirement for a high standard of professional competence and growth potential. Knowledge of DLI or Assembler is desirable but not full off-the-job training will be given.

Please write with full details. These will be forwarded direct to client. List separately any companies to whom your application should not be sent. Ref. FY.1633.

This appointment is open to men and women.

ASL CONFIDENTIAL RECRUITMENT
17 STRATTON STREET, LONDON, W1X 8DB
A member of MSL Group International

Edmund Howard's Client Album

PROGRAMMERS RANGE UP TO £5,000 ON-LINE SYSTEMS DATABASE DEVELOPMENT WEST LONDON

Further development within our client's data processing centre has created two openings for self-motivated Cobol programmers to assist with the development of new ON-LINE systems and DATA BASE development. Although systems are not based on Univac hardware, experience gained on IBM or other leading hardware will be given serious consideration.

Our client is a well known international organisation mainly concerned with the production and marketing of industrial and agricultural equipment. The two appointments described are a real opportunity to develop and broaden your experience within a friendly and forward thinking company. For further details please quote CW152.

ICL OPERATORS G2 and G2 + HOME COUNTIES (WEST)

£3,900 rising to
£4,300 after one year

Here is an opportunity to join a leading international organisation, whose products are brand leaders in the power tool market.

Currently they require additional operations personnel with at least 18 months' experience of G2 or G2+. Systems are based on an ICL 1903 T running under G2+ with on-line facilities. The D.P. Centre is spacious and well planned, with an excellent working atmosphere. The company operates a policy of internal promotion. Other benefits include four weeks' annual holiday, a subsidised restaurant and generous discount on company products. For further details please quote CW153.

REAL-TIME PROGRAMMERS & ANALYST PROGRAMMERS UK AND HOLLAND

Some of the most interesting developments in Data Processing today are taking place within the Avionics/Aerospace industry. This development has created a large number of openings for high calibre personnel with scientific or avionics expertise. Ideally, candidates should hold a degree or equivalent and have experience of real-time systems with Assembler and/or Fortran. These are attractive positions offering plenty of variety to individuals wishing to progress in a challenging and rewarding environment. For further details please quote CW154.

SENIOR PROGRAMMER SALARY c. £6,000 p.a. LONDON, SW1

A highly specialised consultancy is currently seeking an experienced senior programmer to assume sole responsibility for the company's commercial programming activities. The successful candidate should possess a sound knowledge of Cobol coupled with in-depth experience of the IBM CICS Operating System. An ability to deal with personnel at all levels is essential. Additional duties will include providing technical support to the operations team to ensure that objectives are met within the timescales laid down. This is a key position for someone with the right qualities whose background combines both skill and professionalism. In keeping with the company's fine reputation for providing a good and efficient service. For further details please quote CW155.

Edmund Howard & Partners Computer Personnel Consultants

5 Brighton Road, Surbiton, Surrey. Telephone 01-399 9183.
38 Grafton Street, Dublin. Telephone 775 756.

LONDON CUSTOMER ADVISOR

(pre & post sales support) (timesharing)

Income c £6,000 including
performance related bonus
plus car or car allowance

This position is within the Government/public sector sales region of a major computer services company engaged in on-line computer services. The company's products, facilities and resources have secured its position as a market leader. To complement its existing Government sales and support group, it now requires a person with the following skills and attitudes:-

- * sound technical experience, ideally of on-line systems
- * FORTRAN programming skills and a degree in a numerate discipline
- * the ability to communicate effectively with clients and to respond to a sales orientated working environment
- * interest in working in an environment where reward is related to performance.
- * should have an investigative mind

This is an ideal opportunity for someone coming from a technical background to move into a commercially based sales role in the fastest developing sector of the services industry.

CONTACT DAVID SCARLETT:
ADVISING CONSULTANT ON:

01-935 0671

REF. NO. 77/09/19

SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 5761 **FREEPOST**
Freeport, Equity and Law House, 35-37 Great Charles Street, Queenway, Birmingham B3 2BR

MANCHESTER 061-833 0676 **FREEPOST**

Freeport, Corn Exchange Buildings, Corporation Street, Manchester M4 6BD

LONDON 01-935 0671 **FREEPOST** c
Freeport 6, 102, Blandford Street, London W1E 1JZ

DATABASE & T/P in SURREY

**JUNIOR ANALYSTS to £5,750
ANALYST flextime**

Our clients innovative team, based in an attractive tailored D.P. Complex have already gained considerable expertise in the use of Database techniques and on-line facilities.

They are now entering a major development phase in order to provide a more sophisticated group service in the production, finance and distribution areas.

This opens the door to increased Real Time and probably Distributed Processing projects and represents a considerable challenge to the following appointees:-

2 JUNIOR ANALYSTS

OR

**Young O & M Analysts
SYSTEMS ANALYST**

Ideally young IBM programmers with appreciation of systems design.

You would already possess two years commercial experience, together with the potential to rise to a more creative user liaison role.

This is an opportunity to contribute to an exciting era of the groups growth which will reflect in your expertise gained in state-of-the-art projects.

Contact: LONDON OFFICE on:
01-935 0671

REF. 77/09/20

SC Computing
Services
Association

Office 1514

TPS ONLINE SYSTEMS:

PROGRAMMERS

(Minimum 1 year ICL)

SENIOR PROGRAMMERS

SYSTEMS ANALYSTS

LECTURERS (SOFTWARE)

IF YOU HAVE ONLINE SYSTEMS EXPERIENCE OR WISH TO ACQUIRE IT
WRITE OR PHONE:

TELECOMPUTING, SEACOURT TOWER, WEST WAY, BOTLEY, OXFORD (0865) 723621

£3-5 1/2 K

TELECOMPUTING

SPECIALISTS IN ONLINE TRANSACTION PROCESSING SYSTEMS

OXFORD LONDON AMSTERDAM

Telecomputing is established as the expert supplier of online systems for ICL computers. TPS is the world's leading tp monitor software on this range.

Our continuing success and outstanding growth means we need more people to work on client projects in London and other U.K. and international locations but particularly at our Oxford offices.

EUROPE'S LEADING SPECIALIST RECRUITMENT CONSULTANTS

TECHNICAL MANAGER for the MIDDLE EAST to £15,000 p.a.

Modern Society
with Western amenities

+ NEW FURNISHED FLAT (Married or Single)
+ TERMINAL BONUS (2 to 3 year contract)

THE COMPANY is a major distributor for one of the premier minicomputer manufacturers who already have a sound user base in the area and whose business continues to expand at a high rate.

RESPONSIBILITIES are for all applications development and technical support with regard to the computer systems distributed and supported by the company. The Manager will control a team of around eleven software and hardware specialists, all the work being applications orientated. In addition, he will personally become very much involved in the technical work.

REQUIRED PROFILE is as follows:

1. Real Time experience is essential.
2. Must have controlled a technical team.
3. Knowledge of commercial applications.
4. Able to play a technical as well as managerial role, ideally having knowledge of COBOL and FORTRAN, and having worked with minis.
5. The ability to adapt to an unfamiliar environment.
6. Age likely to be in the range 25 to 40.

TRAINING of considerable duration will be provided.

THE ABOVE POSITION OFFERS AN EXCELLENT OPPORTUNITY TO ACCUMULATE CAPITAL IN A POSITION OF RESPONSIBILITY.

Please reply without delay, quoting ref. CW 914.



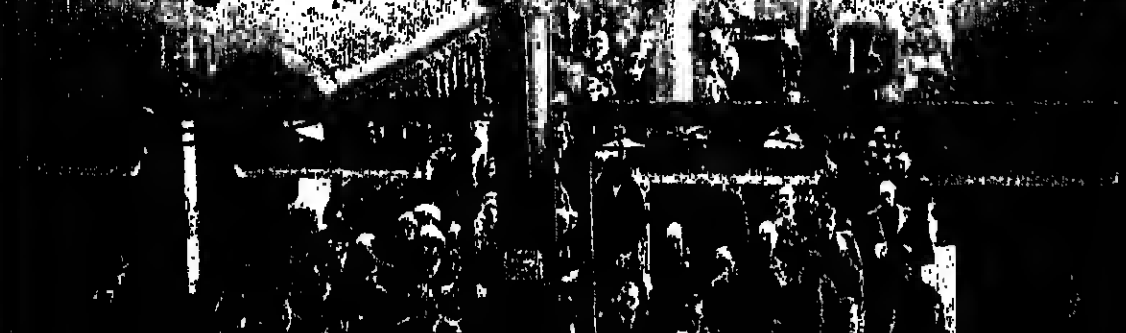
Crown House Morden London SM4 5EU

consultancy division

01-540 8311

24 hour answering service

What if we said you wouldn't have to make this journey any more?



Informal interviews: Great Eastern Hotel, Liverpool Street, 9am-9pm, 27th September, 1977.

Are you fed up with the expense and discomfort of coming into town every day? Then we have some attractive computer jobs at the North East Thames Regional Computer Centre near Harold Wood Station. From there, the Centre provides a range of computer services aimed at increasing the efficiency of health care throughout Essex and North and East London.

If you are experienced in systems analysis or programming at junior, senior or management level, calling in at the Great Eastern Hotel (Abercorn Rooms, entrance in Bishopsgate) could be your first step to a better job. You can

chat to our representative in a relaxed atmosphere and see slides and publicity material relating to the Centre's role which covers a wide spectrum of computing activities using a large 1900 mainframe, various mini, and micro computers.

If you are unable to see us on Tuesday, either call us at the hotel on 01-283 4363 Ext: 309 or write or phone for job descriptions and application forms to the Regional Personnel Officer, North East Thames Regional Health Authority, 40, Eastbourne Terrace, London W2 3QR. Tel: 01-262 8011 Ext: 143.



"I'm analysing the tea-lady's performance next!"

Compete with such projects! You must be joking.

That's why we're after men and women who've had their fill of the 'big-time' and want to get back to more run-of-the-mill stuff... like developing new flexible systems to meet our continually changing sales, finance, production and distribution needs.

So, if you can put up with the drag of being involved in a variety of major projects...

...the incredible bore of working in a highly creative environment - soon to feature an IBM 148 worse luck...

...and, if you can bear the stigma of joining one of the country's largest specialist engineering Groups which has foolishly almost doubled in size over the past three years and which the pundits say has enormous growth potential...

...then the sooner you get stuck into the control implementation, documentation and maintenance of cost effective systems for us - the better we'd like it.

Systems Analyst-Finance Development

To join a head office Project Team working on Group financial systems. Educated to 'A' level with recognised training, you must have at least a year's experience in systems analysis.

Systems Analyst-Production Control

Educated to 'A' level and formally trained, previous experience of production control in an engineering environment would be an asset. You'll be based at a construction equipment company in Gainsborough which is currently remodelling its production plant.

Still with us?

Then certainly salaries, benefits and incentive training scheme will encourage you to stay.

And the chance to live in an attractive town and offers excellent facilities plus cheap housing.

If you know a good thing when you see it, contact Peter Smith, Leyland Special Products Group, Sysonby Lodge, Nottingham Road, Mablethorpe, Lincolnshire LE13 0PA. Tel: Mablethorpe 4041.

Leyland Special Products

Are you interested in a career in automation?
Contact:

HOLLAND SYSTEM HOUSE
Rijkswaagweg 19, De Meern, Holland

Currently we are looking for experienced

**COBOL PROGRAMMERS/
ANALYSTS**

Fortran experience will be an advantage.

Enclose a detailed c.v.

FREELANCERS

Get a new career building

Phone Peter
01-402 4444

OS COBOL

North England

Permanent or Contract

Ring David Atkin
01-402 4444

MANCHESTER TELEPROCESSING AND DATA BASE DEVELOPMENT OPPORTUNITIES

Our client is a major manufacturing company supplying the motor industry. It is now entering an exciting phase of new development in the production, stock and distribution areas, and this has led to the following vacancies:

PROJECT LEADER
c. £5,500

Applicants for this position should have 2 or 3 years' experience implementing significant systems in the relevant fields. Experience of data base and teleprocessing is essential as is a knowledge of programming. Education should have preferably been to degree level.

**PROGRAMMER/
ANALYST TO £4,000**

Programmers with a minimum of 2 years' COBOL experience and 'A' level education who wish to progress into Systems Analysis are ideal for this position. Experience with Database or teleprocessing would also be advantageous.

**PROGRAMMER
TO £3,500**

A minimum of 1½ years' experience of COBOL, 'A' level education and the desire to join a professional department where career progression comes quickly are required for this position.

Our clients' premises are located near the City Centre with ample free parking. The company offers excellent conditions of employment including assistance with relocation expenses where applicable.

CONTACT TONY DEANE on: 061-833 0676
ADVISING CONSULTANT

REF. NO. 77/08/21

SPECIALIST COMPUTER RECRUITMENT LTD.
BIRMINGHAM 021-236 3781 **FREEPOST**
Freepost, Equity and Law House, 33-37 Great Charles Street, Queensway, Birmingham B3 9EP
MANCHESTER 061-833 0676 **FREEPOST**
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD
LONDON 01-925 0671 **FREEPOST**
Freepost 6, 102 Blandford Street, London W1E 1JZ

Computing
Services
Association

Office in 1514

CONTRACT & PERMANENT SYSTEMS PROGRAMMERS

SALARY: circa £8,000 or £180 p.w.

A major U.S. mini-computer manufacturer urgently seeks to advance their compiler development program by enlargement of its project team. The essential requirement is a solid background in assembler ideally combined with compiler or simulator software development.

Several grades of applicants are required — Senior Project leaders having not less than 5 years assembler preferably in an IBM main-frame environment; Senior programmers will have not less than 4 years assembler and Programmers in excess of 2 years.

In addition to exceptional salaries our clients offer numerous other benefits including overseas travel and non-contributory pension scheme.

Interviews will be held the week following this advertisement through the middle of October and offers will be made to successful candidates within 1 week of interview.

Ref: 38/1



MINI PROGRAMMERS, ANALYSTS AND CONSULTANTS N. EUROPE

THE COMPANY: Is a large international consultancy and systems implementation group. In keeping with its prestigious reputation it urgently requires top calibre personnel to implement its rapid expansion programme and has retained Informatix to assist with their personnel requirements.

TECHNICAL REQUIREMENTS:

- Analyst/Programmers having not less than 2 years' experience of Assembler programming relating to Mini Computer applications.
- Senior Analyst/Programmers having not less than 4 years experience of design and implementation of mini computer systems for on-line and/or real-time applications involving assembler level programming in a mini computer environment.
- Consultants will have not less than 6 years of mini related experience preferable with exposure to either communications, networks or sophisticated T.P.

Telephone: 01-409 0468



REAL-TIME MINI COMMUNICATIONS GATWICK/HOLLAND

**U.K.: circa £7,500
HOLLAND: £12,000+**

A major International Software House requires Senior Analysts, Analyst/Programmers and Applications Programmers who will be initially based near Gatwick and thereafter be transferred to Holland.

Applicants with Real-Time and hopefully communications experience are ideally required. Additionally persons with a background in marketing-support would be useful in another important area.

These positions will appeal to persons who value job interest and career development at least as highly as monetary benefits. Only applicants prepared to view their next move as long-term will be considered ideal for these very important appointments. Real and tangible fringe benefits add to the considerable attraction of this company and interested applicants should phone as soon as possible to arrange an interview in London for late September or early October.

Ref: 38/2

**CONSULTANTS UP TO £15,000
ANALYSTS/PROGRAMMERS £10,000
Dependant on qualifications and experience
8% HOLIDAY BONUS**

PREREQUISITES:

Ideally candidates should have a professional qualification or a degree equivalent preferably related to computer science, mathematics, sciences or related areas. Significant relevant experience may be acceptable in lieu of the aforementioned requirements.

THE PROSPECTS:

In addition to excellent salaries candidates will meet with technically rewarding projects and rapid advancement career prospects are open to those whose contribution enhances the professional reputation and expertise of this group — a world leader in 'State-of-the-Art' systems implementation.

THE REMUNERATION:

Relocation allowances will be reimbursed to candidates and their families. Four weeks' paid annual holiday plus 8% holiday bonus is payable in addition to salaries adjusted upwards to meet cost-of-living differentials. Temporary accommodation will be provided at the outset pending location of permanent accommodation.

INTERVIEWS:

To be held in London during September and early October. It is anticipated that employment offers will be made to successful candidates within 10 days of interview.

Ref: 38/3



Avon House, 360-366 Oxford Street, London W1N 9HA.
(Opposite Bond Street underground)
Telex: 28800 INFORMATIX

OPERATIONS SUPPORT

Centre-File is one of the leading Computer Bureaux in the country currently providing services to some 2,500 industrial and commercial organisations.

Due to expansion of our 'on-line' Batch and Custom Build services we require a number of additional staff to assist in the day-to-day running of our services which are run on our three IBM 370/155 machines.

We are looking for mature and responsible people, experienced skills leaders or operators would be ideally suited, with sound knowledge of IBM OS, JCL and utilities.

Salaries within the range of £3100-£3200 will depend on experience and in addition the Company offers an extensive range of fringe benefits.

Applications should be addressed to Mike Atkinson, Personnel Officer, Centre-File Limited, Seabury House, 16-22 Furnival Street, London EC4A 1JU.



DP Training Consultant

to £8,000

BIS Applied Systems Limited, a leader in DP management consultancy in the UK and overseas, as well as a pioneer and supplier of a wide range of training courses, wishes to recruit additional staff into the expanding Training Division.

The job provides an opportunity to work in a highly skilled team of training staff and technical consultants. The Training Consultant's role will be to participate in the development and presentation of courses covering a wide variety of subjects including Programming Techniques, Systems Analysis and Design, Real Time, Data Base and Management topics.

The work offers scope for practical project exposure thus ensuring a long term career path within the training function or in the consulting divisions of the company.

There are also opportunities for occasional overseas travel. Applicants are invited to write or telephone for further information to Derek Potte.

BIS Applied Systems Limited
79-80 Blackfriars Road London SE1 8HB
Telephone 01-928 9511



XOREN BILTON HOUSE

We are a small software house specialising in computer systems and are currently looking for

REAL-TIME MINI SOFTWARE SPECIALISTS

£4,500-£7,000

Applicants should be able to demonstrate a good understanding of real time systems preferably with experience in such fields as communications, message switching and process control. They should also have a sound knowledge of at least one computer (experience on PDP 11s would be a particular advantage).



Please write to or telephone Mr. J. Jarvis giving details of experience.

64/68 Uxbridge Rd
Ealing, London W5 2PL
Tel. 01-867 1131

PROGRAMMER/ANALYSTS

Brentford c£4,500

The Company wishes to recruit two analyst programmers to participate in the development of new systems on an ICL 2960 and a recently purchased mini computer. Applications are invited from men and women with two or three years' experience preferably in an ICL 2960 environment using PLAN and George. Enthusiasm and a professional approach towards the job is essential. If you feel you can satisfy these requirements we offer:

- A competitive salary.
- An excellent opportunity to learn new and exciting techniques.
- Comprehensive fringe benefits including free lunches.

Please write or telephone in strict confidence to: The Data Processing Manager, John Mowlem & Company Limited, Westgate House, Ealing Road, Brentford, Middlesex TW8 0QZ.

Mowlem

ANGLIAN D.P. SERVICES LTD

POTENTIAL PROJECT LEADERS

Are you ready to take responsibility for the analysis and design of major systems in the financial services industry? If your proven experience includes similar development on IBM 370 hardware that's fine, but a good education plus the character and personality to communicate effectively with all levels of management are equally important.

Systems Analysts with equal abilities but less extensive experience on any hardware, also now and progress to future leadership positions. This client expects high qualities in its staff but equally offers high quality of employment in return. Ring: Bryan Richmond, 0603 887233 at any time (or leave a message) or write: East Anglian Systems Ltd., P.O. Box 70, Norwich NR1 4ET.

IMPC IRISH OPPORTUNITIES

SYSTEMS SUPPORT MANAGER — IRELAND DUBLIN — Salary Negotiable + CAR + BONUS

This is a senior appointment reporting to the General Manager of an established multinational computer supplier.

We want applications from people who can identify with, and contribute to, the Company's marketing objectives and with.

- a strong programmer/analyst background
- demonstrable experience in project management
- ability to negotiate with Software Companies
- ideally a knowledge of small I.B.M. systems

As part of the management team you will:

- lead and develop the Systems Support Groups in pre- and post-sales activities
- assist in the development and implementation of sales and marketing strategies.

THE REWARDS

A high basic salary with attractive incentive bonus — Company car — First-class fringe benefits and high grade technical and management training.



IMPC (Ireland) Limited
33 Mespil Road
Dublin 4
Ireland
Telephone: 881277

Write or telephone now to Pat Reiter, Managing Director, quoting reference CW004.

SALES EXECUTIVE — IRELAND

POTENTIAL — £11,000+

DUBLIN

International computer manufacturer, with a large installed base of small sophisticated computers has immediate vacancies for experienced sales executives. If you:

- have a proven sales record
- have a sound background in IBM based computers
- can conduct top level sales negotiations
- are highly motivated and seeking career development

Then the challenge and high earnings potential of this opportunity will appeal to you.

THE REWARDS

A generous basic salary, and a highly rewarding commission plan will reward your success by making you one of the highest paid salesmen in the industry. Your first year's income will be guaranteed at a mutually agreeable level. The rest will be up to you, with no limit.



IMPC (Ireland) Limited
33 Mespil Road
Dublin 4
Ireland
Telephone: 881277

Write or telephone now to Pat Reiter, Managing Director, quoting reference CW005.

SUPPORT SPECIALISTS — IRELAND

DUBLIN

A major multinational computer manufacturer currently involved in an aggressive marketing programme and an extensive installation schedule of mainframe computers, has urgent need for mature and talented support specialists to join their highly motivated group based in Dublin. Successful applicants will have a strong programming/analyst background ideally with experience of programming in Cobol and RPG (System 3). Involvement in conversion projects and on line systems would be an advantage. Initial projects will involve working with and guiding user companies in the installation and implementation of new computer systems.



IMPC (Ireland) Limited
33 Mespil Road
Dublin 4
Ireland
Telephone: 881277

A high basic salary and first-class fringe benefits will ensure that you are one of the highest paid members of the industry relative to your contribution and experience. Write or telephone now to Pat Reiter, Managing Director, quoting reference CW002.

CAREER OPPORTUNITIES IN IRELAND

IMPC (Ireland) Ltd. currently have assignments for the placement of a number of experienced personnel with Computer Manufacturers, Computer Bureaux and Computer Users. If you have experience in, or feel you qualify for, any of the following appointments we should like to hear from you urgently.

Senior Sales/Marketing Management
Senior Sales Executive
Sales Executive
Systems Support Management

Project Management
Operations Management
Systems Analysts
Programmers

Your application will be treated in the strictest of confidence.

Write or telephone now to Pat Reiter, Managing Director, quoting reference CW001.



IMPC (Ireland) Limited
33 Mespil Road
Dublin 4
Ireland
Telephone: 881277

THE UNIVERSITY OF ASTON IN BIRMINGHAM

ANALYST/PROGRAMMER AND PROGRAMMER

Applications are invited from suitably experienced candidates for the above two posts. The successful candidates will be required to work on an ICL 2960 installation, arrive on site and undertake the installation, set up and maintenance of the system, and the development of the system. The Analyst/Programmer will report through the Systems Analyst to the Data Processing Manager. The Programmer will be responsible for the development of the system. The Analyst/Programmer will be responsible for the development of the system. The Programmer will be responsible for the development of the system.

The Programmer will also report through the Systems Analyst to the Data Processing Manager. The Analyst/Programmer will report through the Systems Analyst to the Data Processing Manager. The Programmer will be responsible for the development of the system. The Analyst/Programmer will be responsible for the development of the system.

Applications should be sent to the Data Processing Manager, The University of Aston, Birmingham, B4 7ET. Tel: 021 359 3111. Closing date: 10/10/77.

UNIVERSITY OF STRATHCLYDE

RESEARCH FELLOWSHIP (PROGRAMMER)

Applications are invited for a Research Fellowship in the Department of Computer Science, University of Strathclyde, Glasgow. The Fellowship is for a period of 12 months, starting in September 1978. The successful candidate will be required to work on a project in the area of computer science. The Fellowship is for a period of 12 months, starting in September 1978. The successful candidate will be required to work on a project in the area of computer science.

MANCHESTER ANALYST/PROGRAMMER DP SUPERVISOR

SALARY NEGOTIABLE

We are retained to recruit a data processing professional for our clients, a public Company specialising in high technology products to the transport industry. The successful candidate will take complete control of a small data processing department utilising Burroughs B700 hardware. Duties will include systems development, programming, tuning and control of operations/data preparation.

Our clients require:—

- a proven track record in systems/programming
- Burroughs experience (preferred)
- an understanding of small machine operations
- good man management skills
- the ability to communicate fluently and clearly at all levels.

Our clients offer excellent benefits including: an above average pension scheme and relocation expenses by negotiation.

CONTACT DAVID WADE 061-833 0876 REF. 77/09/3

SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 5781 FREEPOST
Freepost, Equity and Law House, 35-37 Great Charles Street, Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0676 FREEPOST
Freepost, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

LONDON 01-935 0671 FREEPOST
Freepost, 102, Blandford Street, London W1E 1JZ



PROGRAMMER

We have a vacancy for a programmer to assist with the maintenance and development of systems operating on our IBM System/3. Although preference will be given to those with RPG II, experienced programmers with other languages will be considered.

The work is both interesting and challenging, and the environment friendly and professional. There is scope for personal development and the opportunity to make full use of one's abilities.

The Company is the largest independent company in the poultry production and processing industry. The Head Office is situated in a pleasant rural area.

Application forms available from:
Group Personnel Manager
G. W. Padley Limited
Anwick, Stamford, Lincs.

UNIVERSITY college of swansea

Senior Computer Operator

Applicants are invited from experienced operators for the vacancy of Senior Computer Operator in the Computer Centre. The successful applicant will work under the direction of a Staff Leader on an ICL 19040 computer, operating on a 24-hour basis. The salary will be on the scale £2,800-£3,454 per annum, together with a shift allowance of £275 per month. Applications should be sent to the Personnel Officer, University College of Swansea, Singleton Park, Swansea, SA2 8PP. Closing date: 10/10/77.

WATERFORD REGIONAL TECHNICAL COLLEGE

LECTURER/ASSISTANT LECTURER in Computer Science

Applications are invited from suitably qualified candidates for the following permanent whole-time lecturing post: **LECTURER** in Computer Science. Experience of programming in Cobol and RPG is desirable. **ASSISTANT LECTURER** in Computer Science. Experience of programming in Cobol and RPG is desirable. Applications should be sent to the Personnel Officer, Waterford Regional Technical College, Cork Road, Waterford. Closing date: 10/10/77.

London Borough of Enfield

Programmer

£3,694-£4,072

Applications are invited for this vacancy in the Borough Treasurer's Department. Applicants should have at least 1 year's programming experience, preferably with ICL.

The Borough's computer installation currently consists of an ICL 1902 T and is developing a 1902 installation.

Application forms are obtainable from the Borough Treasurer's Department, 100, Watlington Road, Enfield, London N4 3JL. Closing date: 10/10/77. Reference: GRA/5.

01-935 0671



For as long as there has been a UK Software Industry, SPL has been known as the Company that makes computer systems work: we have completed over 1,000 projects throughout the world and covered almost every aspect of computing including:

- ★ Control and automation for industry
- ★ Distributed processing for commerce
- ★ Compiler and operating systems for DP manufacturers
- ★ Telecommunication networks for banks

Our hallmark is the delivery of the goods and our standards and methodology reflect this. Our most important asset is the intelligence, expertise and adaptability of our staff. We are looking for more professionals to join us.

BASIC SOFTWARE

Our Basic Software Division needs people at all levels - technical managers, innovators, designers and programmers. You must have good experience in one or more of the following:

- ★ Language design
- ★ Compiler/Assembler writing
- ★ Operating Systems
- ★ Filing Systems
- ★ Linkers/Loaders

You will be based in London or Nottingham. Some of the work will be done entirely overseas: other projects may be for overseas clients but executed mainly in the UK.

To discuss these opportunities contact:

Alan Taylor,
SPL International,
12-14 Windmill Street,
London W1P 1HF.
Tel: 01-636 7833

or

John Guast,
SPL International,
25 St. James Street,
Nottingham.
Tel: 0602 45011

London · Nottingham · Manchester · Paris · Brussels · Frankfurt · Milan · Stockholm · Helsinki · Madrid · Amsterdam



Basingstoke District Council

Computer Programmer

£3366 per annum - £4095 per annum plus approximately £466 per annum supplements.

A further vacancy has occurred in the Finance Department for a Computer Programmer to work on an ICL 2904 32K installation with 2-EDS 60 and 4 tapes.

Preference will be given to candidates with good experience of COBOL/CL/GEORGE IS and Find II, and of ICL software.

Commanding salary, within the scale, will depend upon experience. Housing accommodation may be available and assistance with removal costs will be given if required.

For an application form returnable by 3rd October, 1977, please telephone Basingstoke 56222 Ext. 207, or write to: The Personnel Manager, Basingstoke District Council, Civic Offices, London Road, Basingstoke, Hants RG21 2AJ.

The Research and Statistics Group of the Inner London Education Authority requires a

SENIOR PROGRAMMER

(PROFESSIONAL B)

to work on a number of major applications in the field of education statistics. Applicants must have had several years' experience of FORTRAN programming preferably in an IBM 360/370 environment, and should be accustomed to handling large and complex databases. Acquaintance with CRJE and SPSS would be an advantage. The successful candidate will be expected to provide assistance and advice to less experienced staff, and will need to be able to communicate with researchers, statisticians and administrators. Salary Scale £4,442.80 - £6,066.80 (inclusive of London Weighting and Phase 1 and 2 Supplement). Details and application forms from the Education Officer (ED/Estab. 24/1), Addington Street Annex, The County Hall, London SE1 7PB. Please enclose a stamped addressed envelope. Forms to be returned by 7th October, 1977.

Stone Executive

SNR. ANALYST

NORWICH to £5500
Previous proven exp. of CICS / VS / DL1. Financial environment. Excellent prospects - relocation assistance. (Ref. 3971.)

ANALYST

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Min 5 yrs exp. in IBM COBOL under DOS and/or being supervisory exp. in a similar position. Excellent prospects - relocation assistance. (Ref. 3971.)

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As well as the above positions we need 2900 VMEB and VMEK Ops and 1900 Oete Control Clerks, VDU Operators and IBM SYSTEM 3 Operators for a variety of urgent and forthcoming contracts.

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MAJOR NEW DEVELOPMENT FOR AN INTERNATIONAL ORGANISATION

Control file is one of the leading computer bureaux in the UK currently providing services to some 2,500 industrial and commercial organisations, many of which are household names. We have recently acquired a major contract to develop the Divors Club Credit Card System and as a result require experienced programming and systems staff to supplement our existing research and development team. The new system is a comprehensive Data Preparation technique and Software operation on our IBM 1170 / 156 equipment.

Our requirements are as follows:

SENIOR SYSTEMS ANALYST

Salary range £3320-£5400

This is a senior appointment, reporting to the Project Supervisor requiring a highly motivated 'self-starter'. Applicants should have a Cobol programming background and at least two years' systems design experience. Responsibilities will include the specification and control of a wide range of hardware together with the overall monitoring of the development progress of the development team.

COBOL PROGRAMMERS

Salary range £3100-£3320

Vacancies exist within the Research and Development team for Cobol Programmers. Salary will depend upon experience however applicants should have a minimum of 18 months' systems design experience. An attractive range of fringe benefits are applicable to all positions and applications should be made in writing to: The Personnel Manager, Control File Ltd., 18-22 Farnwell Street, London EC4A 3ET.

COMPUTER OPERATOR

required for a sophisticated satellite computer system in pleasant surroundings. Previous experience preferred, but not essential. Starting salary to range £2142 p.a. rising to £2854 p.a. plus an allowance of £1000 p.a. for 1977. 4 weeks holiday, superannuation scheme. Apply in writing with full details to: The Personnel Manager, Control File Ltd., 18-22 Farnwell Street, London EC4A 3ET.



Real Time, Database

Unusual opportunity to learn REAL TIME and DATABASE techniques and to work in a lively environment in the West End of London (near Marble Arch) - ideal for people who can:

- think on their feet and solve problems quickly
- interface with a variety of users - from Directors to clerks
- work to tight deadlines.

If you are looking for a stimulating, challenging post where you can learn and progress, this could well be it. Current openings are for:

ANALYST/PROGRAMMER c. £4,750

Have you an outgoing personality, good appearance and speech? Plus initiative, flexibility and the ability to work at senior levels? You should have had sound commercial experience (any language, any hardware), and Real Time experience would be valuable, but not essential. MUMPS training will be given. (Ref. 131.)

PROGRAMMER c. £3,500

Sound RPG experience is essential (any hardware) and MUMPS training will be given. Graduates with industrial experience will be considered. Personality factors are important - you will be working with users; this is NOT A DESK-BOUND JOB. (Ref. 130.)

We have been retained by ATV Management Services Ltd. to advise on these extremely interesting career openings, and we would be glad to tell you more. Please ring us for an initial confidential discussion, or write briefly quoting the appropriate reference.



Tel: 01-637 5796
52-53 Margaret Street
London W1N 7FE

COMPUTER ANALYST/PROGRAMMER

Newcastle upon Tyne Up to £5007

British Gas at the Mathematics and Computing Department, Engineering Research Station, Killingworth, require a computer analyst/programmer.

The duties are to maintain and develop scientific computing facilities for use in processing pipeline inspection data. The work includes systems and applications programming, hardware and software evaluation, providing advice and assistance to in-house users, and setting up an operational service to the industry. The present computer configuration is a PDP 11/45 running RSX-11M.

You should have a degree or equivalent qualification plus computer programming experience including assembler-level language (preferably MACRO) and FORTRAN experience.

A requirement to work non-standard hours may arise and, when applicable, additional allowances are payable.

The salary is within the range £3777-£4695 plus £12 Flat Rate Supplement. Initial placing, according to age, qualifications and experience.

Please write for an application form, quoting reference ERS/803908, to the Senior Personnel Officer (R&D), British Gas, 59 Bryanston Street, London W1A 2AZ.

Closing date for applications 18 October 1977.

BRITISH GAS

Opportunities in Australia

Project Managers/Senior Consultants
Senior Systems Analysts
Analyst/Programmers

up to \$A12,000-18,000

Logica is one of the world's leading software, systems and consulting companies with 500 staff and offices in Europe, America and Australasia. Our local Australian office is in Sydney and we have clients drawn from major private and Government computer users. Our reputation is that of one of the highest quality consultancies in Australia.

Our immediate requirement is for Project Managers, Senior Consultants, Senior Systems Analysts and Analyst/Programmers to work with advanced on-line commercial systems, for mini computers and dedicated small mainframes. Successful applicants will be based in Australia permanently or, on 2-3 year assignments. Logica will bear the cost of air passage and relocation expenses for successful applicants and their families.

Applicants must have a proven record of achievement in their field, and be ambitious, self motivated and flexible in their approach to work: previous experience with both



mini-computers or mainframes working in an on-line environment with a range of languages. A degree or equivalent is desirable but not essential.

In our fast growing company, career prospects are excellent with opportunities to work on a wide range of projects. Salaries and fringe benefits will be attractive and if you want to travel, assignments outside Australia in the Logica group can be arranged for the right candidate.

Write with brief career details, using Freepost, or telephone for an application form to the Personnel Department
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Freepost
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64 Newmarket Street
London W1A 4SE
telephone 01-637 9111

Tutor Computer Training Centre

£5278-£6800 p.a. inc.

Applicants should have

- Five years experience in computing - at least two working with IBM machines, ideally in an Operating System environment.
- A good knowledge of IBM Job Control Language, Cobol and/or Fortran.
- The ability to communicate easily with all levels of staff (teaching experience would be an advantage but is not essential).

The job will involve

- Teaching on courses given by the Centre.
- Preparing course notes and training manuals.
- Writing and testing programmes.
- Participating in the review of existing courses and the development of new ones.

The Training Centre, located at our Headquarters in London, is primarily concerned with running courses for our own staff, but certain courses are open to outside users. Courses have been developed for all levels of staff involved with computer programming, operating and applications. Some appreciation courses are also held.

Applications stating full relevant details and present salary to the Group Personnel Officer, CENTRAL ELECTRICITY GENERATING BOARD, Sudbury House, 16 Newgate Street, London EC1A 7AU, by October 6, 1977. Quote Ref. DT/261.



The UK Division of CAP/Gemini/Sogeti Product Marketing Company wish to appoint experienced and professional

PRODUCT SALESMEN

UK, London based £6,500-£12,000

The products involved are

1 SYSTEM 2000

For this you must have

- ★ a minimum of 5 years in OP
- ★ 360/370-OS implementation, development or support experience
- ★ Mobility

2 MULTIFASTER, SYSIF, SYNC SORT, OPTIMISER 11, PLAN IV

For these products you need

- ★ a proven sales record in the service industry
- ★ experience of IBM installations, preferably OS

For full details please ring Jenny Dalrymple-Hay on 01-493 2947 or Bedfordfield (04544) 4579

DIRECTORATE OF ADMINISTRATION

Computer Unit

Systems and Programming Staff for ICL 2970

All Grades from Grade 3 (£3,230 p.a. min.) to Grade 8 (£6,142 p.a. max.)

Increases in demand for access to computer facilities and for computer services had led to the installation of an ICL 2970 computer with an extensive telecommunications network of RJES and VDUS. With the planned development workload the system will be progressively enhanced to become a 2M BYTE machine with 3000M of on-line storage by the end of 1978.

The expansion of the unit and its sphere of activity means that vacancies have arisen for all levels of systems and programming staff in the section of the computer unit concerned with the development of computer systems in both financial and water management applications areas. Applicants, male or female, must have a proven record of data processing in the areas of programming, system design or implementation.

Graduates will be considered for posts of Trainee Programmer.

Experience in a similar environment would be an advantage although training will be given where relevant. Relocation forms and job descriptions (state area of work preferred) may be obtained from: The Computer Manager, Anston House, 137/138, Preston Road, Brighton, Sussex BN1 6AF. (Tel. Brighton (0273) 807101 Ext. 206). All application forms must be received by 8th October, 1977.

Southern Water



ANALYST/PROGRAMMER

salary £5000-£6000
+ COMPANY CAR

Join a dynamic Midlands company marketing DEC and other microcomputers on a turnkey basis. We seek 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st, 32nd, 33rd, 34th, 35th, 36th, 37th, 38th, 39th, 40th, 41st, 42nd, 43rd, 44th, 45th, 46th, 47th, 48th, 49th, 50th, 51st, 52nd, 53rd, 54th, 55th, 56th, 57th, 58th, 59th, 60th, 61st, 62nd, 63rd, 64th, 65th, 66th, 67th, 68th, 69th, 70th, 71st, 72nd, 73rd, 74th, 75th, 76th, 77th, 78th, 79th, 80th, 81st, 82nd, 83rd, 84th, 85th, 86th, 87th, 88th, 89th, 90th, 91st, 92nd, 93rd, 94th, 95th, 96th, 97th, 98th, 99th, 100th, 101st, 102nd, 103rd, 104th, 105th, 106th, 107th, 108th, 109th, 110th, 111th, 112th, 113th, 114th, 115th, 116th, 117th, 118th, 119th, 120th, 121st, 122nd, 123rd, 124th, 125th, 126th, 127th, 128th, 129th, 130th, 131st, 132nd, 133rd, 134th, 135th, 136th, 137th, 138th, 139th, 140th, 141st, 142nd, 143rd, 144th, 145th, 146th, 147th, 148th, 149th, 150th, 151st, 152nd, 153rd, 154th, 155th, 156th, 157th, 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We really believe that the independence we give our Field Service Engineers helps them to make the most of the challenge provided by the world leaders in mini-computers.

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digital

Computer Programmer

Bottom Division of UOP Limited is the world's leading manufacturer of suspension seating for the truck, tractor and industrial equipment markets. We are currently seeking an experienced programmer to join our small but expanding D.P. Installation, which utilises an IBM System 3, Model 12.

The successful applicant will have a minimum of three years' programming experience, using RPG II, and will probably have worked in a manufacturing environment. Commencing salary will be dependent upon age and experience, and the company offers a wide range of benefits, including 28 days' annual holiday and contributory pension scheme with free life insurance benefit.

In first instance, please write or telephone for an application form to:

UOP
Mrs. P. Cowgill
Personnel Officer
Bottom Division
UOP Ltd.
Weedon Road Industrial Estate,
Northampton, Tel: (0534) 55621.

COMPUTER MANAGER

NORTH LONDON (N.18)
UP TO £4,000 p.a.

The job: to supervise a new mini computer installation consisting of a Nixdorf 8835 processor with console, one split disc unit, line printer and 2 full time operators.

The person: ideally an ambitious young Operator or Programmer educated to at least 'A' level and desiring to make their first move into computer management.

The company: a private company with approx. 300 employees manufacturing a wide range of food products.

How to apply: Phone or write for application form to Mr R. J. Ashby, Company Secretary, Rayner Co. Ltd., Commercial Road, Edmonton, N.18. Tel. No. 01-807 3080.

PROGRAMMERS

Experienced minicomputer professionals required on our own applications.

Preferably with DEC experience. Contracts for at least 4 months. £160-£180 weekly. No Agencies. 01-368 7348.

UNITED KINGDOM ATOMIC ENERGY AUTHORITY Northern Division

COMPUTER PROGRAMMER

A requirement for a Computer Programmer has arisen in the Computer Section at Windscale Nuclear Power Development Laboratories, Cumbria. The Section will shortly be basing its computing services on an ICL 2880 supporting both RJE and in interactive terminals and this post will provide an opportunity for the selected applicant to acquire experience in Systems Analysis and in the writing of data bank software.

Qualifications and experience

Applicants (male or female) must possess a Higher National Certificate or Diploma in a scientific, engineering or mathematical subject, or an equivalent qualification. The languages used are COBOL and FORTRAN; familiarity with ICL or IBM operating systems is desirable but not essential.

Terms of appointment

Appointment will be to the Scientific Officer grade with salary within the range £2,300-£3,775 per annum. In addition the following supplements are payable:

- (i) a supplement of £13.20 per annum
- (ii) a supplement of 5% of total earnings (subject to a minimum of £10.88 per month and a maximum of £17.40 per month)

Excellent service conditions include 20 days annual holidays and other benefits appropriate to a staff appointment.

For application form please write or telephone - quoting reference S908/J170, to:

Staff Officer, Windscale Nuclear Power Development Laboratories, Windscale Works, Scaresdale, Salford, Cumbria CA20 1PG. Tel: Scaresdale 333 Ext. 406.

Closing date for receipt of completed application forms is 7 October, 1977.

Make your future with **UKAEA**

UNIVERSITY OF SOUTHAMPTON COMPUTING SERVICE

Applications are invited for posts of:

PROGRAMMER

to join a team providing technical support on the University's 2870 computer.

Applicants should have an experience in programming high level languages on a scale system. Knowledge of experience of a microcomputer system such as the GEORGE 3 is also an advantage. Some experience in the use of the scale system would be an advantage. Starting salary according to qualifications and experience within the scale £2,300 or for an exceptionally qualified person scale £2,500. £5,627. Tel: 77789/0/1.

COMPILER SUPPORT PROGRAMMER

to be responsible for the design and maintenance of a FORTRAN compiler for the 2870 and currently being developed by the University's 2870 machine.

Applicants should have an experience of the design and maintenance of a FORTRAN compiler for the 2870 and currently being developed by the University's 2870 machine.

The post will be available for a 3-year period. Salary according to qualifications and experience within the scale £3,333-£5,627. Tel: 77789/0/1.

Further particulars of the above posts may be obtained from Mr A. J. Lloyd, Department S908/J170, to whom applications should be sent giving a curriculum vitae, the names and addresses of two referees should be sent, the University of Southampton, Highfield, Southampton, SO9 5NH, not later than 7 September, 1977. For quote appropriate references.

SENIOR SALESMAN EIRE SMALL BUSINESS SYSTEMS to £10K

As the Irish distributor for Europe's largest manufacturer of small business machines, they are established as market leader. Their products are highly advanced, exceptionally cost effective, and are constantly upgraded to stay ahead. The local support team is excellent, and can call upon fast and effective back-up from Europe.

This requirement for a Senior Sales Executive has arisen by a combination of fast market growth and release of more new products. The right person will be developed quickly towards a management position and will lead the sales team forward to even more success.

Candidates should be able to demonstrate a good track record with experience of small business systems, minis, VRC, etc. They must be sales professionals able to understand the business objectives of users and perform at Board Level.

This is an opportunity to develop your sales career in a small dynamic Company but still backed by the product breadth, R & D, and technical support of a major manufacturer.

RW 38/1

CONSULTANCY

CENTRAL LONDON BASED, OVERSEAS TRAVEL
OPPORTUNITIES

INTERNATIONAL MARKETING UK Salary £8,000 + Generous O/S Allowances

This top flight British consultancy seeks a person to develop more business in the Middle East.

After developing marketing plans covering a range of consultancy services, the successful applicant will be involved in extensive travel to achieve sales targets. As an experienced person will know, success demands all the traditional sales qualities, plus plenty of patience and resilience. Naturally the rewards reflect the skill required; career prospects within this large consulting group are unlimited.

RW 38/4

TELECOMMS CONSULTANTS c £6,500

Are you looking for an alternative to the traditional telecommunications environment? As a consultant in this expanding department, you will be asked to participate in a wide variety of assignments for UK and Overseas clients. Using your extensive practical experience, you will continue to enhance our client's reputation whilst simultaneously broadening your career within and beyond the telecomms field.

RW 38/5

MESSAGE SWITCHING & COMMUNICATIONS

SALES -£10,000+ AND CAR

This company has established itself as a major force in the market for message switching systems and other communications products. Backed by an efficient support organisation, the products are unrivalled in capabilities and price/performance. The company has thus secured an enviable share of the market and established an outstanding blue-chip customer base, which is growing rapidly. The company's name and reputation are well known throughout the industry, reflecting its very considerable achievements.

The growth of the business has created new sales opportunities throughout the UK and abroad, to exploit one of the fastest expanding markets in the world. It is a dynamic environment which will appeal to ambitious salesmen who wish to influence management decisions. Career advancement will be as fast as the individual's skills will allow.

Managing named accounts or geographical territories, each sales executive will have a successful track record of practical sales experience in communications-based environments.

Candidates must be professional, self-motivating sales executives, with the experience and ability to negotiate at Board level. Knowledge of message switching applications and/or communications networks is advantageous.

Rewards will be by way of high basic salary and commission to produce incomes in excess of £10,000 p.a. Company cars will be provided and there are excellent fringe benefits.

RW 38/2

EDUCATION To £5,000

The "chalk and talk" approach to the teaching of d.p. staff, while not indispensable, is now supplemented by a variety of techniques. Our client is a leading manufacturer of computer systems and they are justifiably proud of the systems they have developed and use for computer-assisted management of learning.

Would you like to make the fruits of your experience available to others? Can you appreciate that special satisfaction that comes from seeing students extending their knowledge and broadening their skills?

If you have one or two years' programming/systems experience and would like to work in a training environment in LONDON contact us now.

There are also the possibilities of more peripatetic roles, providing local educational support, in the NORTH WEST and on the SOUTH COAST.

RW 38/3

hutchinson-scoggins recruitment
10 Dover Street London W1X 3PH
Telephone 01-499 4501

Real-Time—Health Care

The London Hospital Computer Centre is developing and supporting real-time computer services to improve patient health care. The hardware includes a computer, network of 70 terminals in wards, laboratories and administrative offices, and is based on 2 local minicomputers. Laboratory equipment is interfaced to the mainframe through mini-computers.

Intermediate Operator

£4,133-£5,185 fully inclusive

Applicants will have a minimum of 2 years' operating experience.

Basic Operator

£3,495-£4,133 fully inclusive

Applicants will have successfully completed a period of training as operator or have previous experience on comparable equipment.

Staff facilities on site include a sports and social club, squash and tennis courts, swimming pool, golf course, and a library. Temporary single accommodation may be available. Season ticket loan scheme.

For application forms and job descriptions, ring 01-275 5454, ext. 388, applications to be returned to: The London Hospital, Personnel Services, The London Hospital (Whitcliffe), London E1 1BB.

The LONDON HOSPITAL
Tower Hamlets Health District - part of the City and East London AHA (Teaching)

Urgently required in many areas
CONTRACT COBOL PROGRAMMERS
for IBM, ICL and UNIVAC

Compex

84 High Street
Newport Pagnell
Milton Keynes MK17 9JG
Tel: 0505 515151

Promotional Opportunities

The fulfillment of a long term planned expansion programme has resulted in our client wishing to recruit the following additional personnel for its IBM installation in CENTRAL LONDON. Further plans are also at an advanced stage that will augment the present configuration by the introduction of DEC PDP equipment which will be used extensively for teleprocessing.

Chief Programmer up to £6000

To take direct charge of a small team of programmers, the person we are seeking should have a minimum of four years experience of IBM COBOL under DOS or DS. A knowledge of DEC teleprocessing equipment would be an added advantage. The job would particularly appeal to a person looking for the opportunity of a management position while at the same time maintaining a high degree of technical and practical programming involvement.

Programmer Analysts c£5000

Reporting to the Chief Programmer, the position requires a person who prefers a programming bias to their job content. However, in view of the heavy commitment to new projects, applicants should be prepared for a certain amount of associated analysis work.

Experience of COBOL, under either DOS or OS, are essential technical requirements.

Both positions carry the usual benefits associated with a member of a large public group of companies.

MAYFAIR CW36/1

Systems Analysts

City of London up to £6250 + mortgage

A large international banking organisation has engaged our services to assist with the recruitment of Systems Analysts for their installation in the City.

Applicants should ideally have experience of banking systems on an IBM 370. However, candidates with a good proven record of success in other application areas, and who now wish to add banking to their career record, should also apply.

Company benefits include a home loan scheme, free lunches, pension scheme and a total holiday entitlement of over five weeks.

MAYFAIR CW36/2

PDP II RSX IIM up to £6500 London

An international organisation based in London, having one of the most sophisticated real time systems incorporating a worldwide communication network, is seeking additional programmers.

Based on DEC PDP II's and running under RSX IIM using RTL 2, our client wishes to recruit programmers and systems programmers at all levels. Candidates currently seeking a move which will combine technical expertise plus career progression and have worked on PDP II systems should contact the advising consultant as soon as possible.

MAYFAIR CW36/2

Analyst Programmers for the Energy Field

London Based

Have you qualifications and energy to reap the benefits offered by our client, a major international oil company, in the growing North Sea energy business. Commencing Salary is up to £5500 with a comprehensive list of valuable company benefits, including free lunches and season ticket assistance.

Preferably you will have two to three years commercially based IBM COBOL experience and a second language, either Assembler, RPG or PL/I. The job offers you the opportunity to use your communicative skills through contact with users. You will probably be under thirty and a graduate with analytical experience.

To discuss the full specification of this exceptional opportunity, contact the advising consultant now.

MAYFAIR CW36/4

BOOKS

Programming principles and methods

Current trends in programming methodology, Volume 1: Software specification and design, edited by Raymond T. Yeh, 320pp, £13.55. Prentice-Hall International.

In the words of the editor, "The purpose of this series in programming methodology is intended to bring together a collection of tutorial papers in each volume... this first volume is to survey recent developments of programming principles and techniques for the systematic design of well-structured and reliable software architecture."

It includes papers on formal specification of data abstraction; the relationship between programming languages and program structure; a methodology for the design, implementation and proof of large software systems; software structure and reliability; the development of large reliable programs; a discussion on the use of GOTO statements and structured programs; a design methodology for fault-tolerant software control — record driven processing; and, finally, guarded commands, nondeterminacy and formal derivation of programs.

R. C. BROWN

Six high-level languages benchmarked

Programming Languages, Allen B. Tucker, 438pp, McGraw-Hill.

FOR as long as there are degree courses in computer science there will be a market for books like this which help to complicate the field of computers. Six languages are compared and their points of difference are, yet again, accentuated. When, oh when, will someone write a book which accentuates their points of similarity and blow the computer language myth once and for all?

Tucker's work is by no means as bad as some, but there is almost no mention at all of the underlying similarities running through all programming languages. Just one or two pages on this topic would be a measure of redemption and lift any book out of the morass of trivia and suggest to some readers a path towards a new, simplified approach.

Here we have a book written for students of computer science, comparing six programming languages — but not one included. The original reason for developing high-level languages was so that the layman could write his own programs. But the layman has clearly shown we now have drawn a line. High-level programming languages like Tucker's, being

ering away without realising that "high-level" is merely a skillfully marketed euphemism for "inefficient".

As a conventional comparison of six high-level languages, the book meets its objectives. Indeed, it could even be said to justify the claim made in the preface that "this text attempts to unify the study of programming language principles with the study of programming language applications".

However, the second axis of unification — i.e. between different languages, has been completely missed. Each language has been dealt with in isolation from the others — each "language island" has been kept in its fossilised, discrete state — all divisions have been preserved. In the introduction to the chapters on PL/I, its origins in Algol, Cobol and Fortran are mentioned but little reference, if any, is made in the body of the chapter to illustrate this point.

On the whole, for anyone who wishes to study a comparison of benchmarks using high-level languages on a variety of machines, this book must be useful. The book certainly seems to achieve what it sets out to do, but left me with the feeling that it was based on superficial ideas and was in no way relevant to the fundamental problems of our computer-using society. DICK HALES

Lucid within its limits

Information retrieval and the computer, by Or Christopher O. Paice, 200pp, £5.95. No 26 in Macdonald and Jane's Computer Monographs series.

THIS is one of those monographs which are based on notes for a university lecture course, "put into a presentable form," and offered as a general introduction to the subject. The trouble with this approach is that a thoroughly worthy treatment aimed at a very specific consumer may be labelled with a title and a publisher's blurb which lead the general reader to expect something very different from what he gets.

It is, for example, rather disturbing to find a volume published under the title, Information retrieval and the computer, which includes no discussion of the economics of computer-based information retrieval; which deals only briefly with online systems and not at all with the user-system interface; which refers to only three operational databases and no operational retrieval systems and which — on page 1 — assumes that it is a requirement for a computer-based information retrieval system that "there is no middle-man" and the "ordinary user" should be able to enter his own request: when all experience shows that even with the recent rapid growth in the use of online retrieval systems some 80% of usage is made via "middle-men" (albeit information specialists rather than computer specialists).

With the rapid development of the computer, two possibilities emerged: first, the horses could run even faster; second (and more important), the stewards could begin to keep track of events. From the latter arose the notion that it was again feasible to map, evaluate and to direct the heading progress. That is, to know something of where the pursuit of knowledge was heading most successfully, to understand to a degree why some strategies paid off more handsomely, and to know the name of the game.

When the Machine Intelligence series began about 10 years ago, the discipline of it was that had, the editors put it in the introduction to this volume, "a bad name and a disputed nature".

They are today the claim, "Now all this has been clarified. Not a single AI professional can be found who will not say that whatever this Protean field's name should be, its nature has at least been firmly established: the use of machines and machine-oriented formalism to study how knowledge may be represented, measured, manipulated and communicated." This book constitutes the first integrated collection devoted to a theme

Brochure

A 20-PAGE colour booklet on static uninterruptible power supply systems is now available from Chloride Transpack Ltd. Stanley Road, Bromley, Kent BR1 4JP. Tel: 01-880 1800.

Data processing well explained

Introduction to computer data processing, by Wilson T. Price, 500pp, £12.50. Dryden Press.

THIS is an accurately titled book in that it genuinely introduces the reader to all those areas of work or study necessary to enable a beginner to understand data processing, from a feasibility study through systems analysis and design, to programming, operating systems, information codes, data processing machines and even a brief illustrated outline of the history of computing devices.

A practical approach is adopted: principles, techniques and details of equipment emerge largely in response to the needs of various case studies, and useful examples and exercises are a feature of the book. Human aspects are considered from the beginning, and on the technical side the reader is taken as

far as indexed sequential files and the database concept.

Programming is introduced through a very simple simulated machine language and the elements of Basic, Fortran and Cobol, and each concept is very carefully explained. However, many readers would be dismayed by the unnecessary use of GOTO statements and exit from loops by means of a run-time error (p.257) or some kind of user interrupt (p.273 and 275). It is admitted that the chapter is far from a full discussion of Basic, but even so, FOR statements could easily have been introduced and used.

Ideally the simplified machine language might have demonstrated counters and conditional branching as a lead into FOR statements in the next chapter.

Magnetic tape and disc systems are very well treated with excellent diagrams

and all the information one needs to get a firm grasp of the essentials. This second edition also mentions such things as floppy discs and microprocessors but it has not brought itself up to date on matters relating to program structure, perhaps because this would have required too fundamental a revision of material first published in 1972. There is an index and a useful glossary of terms.

There is a wealth of detail and teaching material in the book, and it is well written and beautifully presented — well up to the standard we have come to expect from US textbooks. It should be available in school and college libraries, and it would be particularly useful to many teachers in schools and colleges as a complementary book to the literature relevant to the programming and use of a particular computer system.

ROY ATHERTON

The name of the game

Machine Intelligence II, edited by E. W. Elcock and Donald Michie, 630pp, £24. Ellis Horwood, distributed by John Wiley.

EVER since it ceased to be possible to be a Renaissance Man, a polymath who could encompass the whole of what Edinburgh used to call the Humanities, those engaged in the pursuit of knowledge have been galloping off madly in all directions. All the determined individual could do was put his money on a likely looking horse and hope it led, if not to a winning post, at least past a furlong marker or two.

With the rapid development of the computer, two possibilities emerged: first, the horses could run even faster; second (and more important), the stewards could begin to keep track of events. From the latter arose the notion that it was again feasible to map, evaluate and to direct the heading progress. That is, to know something of where the pursuit of knowledge was heading most successfully, to understand to a degree why some strategies paid off more handsomely, and to know the name of the game.

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which we now perceive to have been our proper business all along.

The book comprises a range of studies on "the unitary theme of knowledge-representation in its bearing on machine intelligence." It reviews theoretical and experimental insights in applications ranging over the fields of mathematical reasoning, deductive problem-solving, knowledge measurement, inductive learning, programming, man-machine dialogue, descriptive methods in empirical science and the design of seeing and language — understanding machines.

The event which concentrated the minds of the distinguished contributors so wonderfully was a two-week NATO Advanced Study Institute held at Santa Cruz, at the University of California.

It is impossible for one person to evaluate the work reported. That is indeed, the

nature of the game. But here you will find reports from the various fronts, set in their true context, by professionals speaking to professionals and advanced students in disciplines which include computer and information science, artificial intelligence, psychology, psycholinguistics, linguistics, philosophy (both natural and unapplied), bio-mathematics, neurology, bio-science and brain research.

At least the riders can now talk to each other (and where the daunting jargon permits, to the bewildered spectators). After 10 years of advance and consolidation, they are talking horse-sense. The combined bibliographies, not the least feature of this thoroughly planned volume, will, in the blurb's words, "put into the reader's hand the keys to virtually everything which is yet known in this subject."

A formbook, at last. DONALD MITCHELL

Computers in fiction

Inside Information: Computers in Fiction, by Abbe Mowshowitz, 345pp, £6.40, Addison-Wesley.

THE division between fact and fiction is not obvious any more, even to those who seek it.

This is because technology, computer technology in particular, has made the impossible less so — "miracles" are a little longer.

Mowshowitz sets up a framework on which he presents science-fiction stories displaying themes of machine dominance, "living", "thinking" computers that become aware of themselves as a critical point is reached, friendly and helpful computers, even a computer that fulfils Man's destiny (the latter in Arthur C. Clarke's classic "The

Nine Billion Names of God").

And from this framework comes a clearer picture of how computers, or even just automation, will, or could, affect society as a whole.

Many statements of the past are now, within the grasp of present-day society, or in the words of the author, "a watered-down version of the new world from the specific technological means for implementing the schemes imagined by earlier Utopian writers."

Science fiction is the arena in which issues raised can be played out "bloodlessly" and from which conclusions may be drawn. However, the book does assume a certain admitted, if not very high, level of knowledge of the subject by the reader.

What is very clear is the closeness of these implica-

Software metrics: key to a fortune

Software Metrics, by Tom Gilb, 282pp, £11.15. Prentice-Hall International.

THIS book is dangerous — it could trigger off a revolution in computer-buying policies. Worth reading for the foreword by Weinberg, even if you don't read anything else, this book is superb value for money. Used in the right way it could also be the key to a fortune. It will probably be either completely ignored or severely criticised by the pseudo-professionals, i.e. those with many years' "experience" which when analysed turns out to be one year's experience repeated many times.

However, the effect on those who can still think for themselves will be staggering. With or without degrees in computer science, with or without years of experience, people who have retained some intelligence, self-respect and integrity despite the vagaries of the computer business will read and discuss this book.

The book will help to crystallise opinion and form a focal point for constructive ideas on how to improve our industry.

In case the penny hasn't dropped, software metrics is a way of measuring the critical properties of computer applications, programs and data.

As Gilb puts it: "Metrics is the language we can use for precise matching of available techniques to the users' requirements... The same metric concepts can be used to specify what we want, to predict what we can expect to get, and to measure what we have gotten."

There is a well-known programmers' saying: "An elephant is merely a mouse with an IBM operating system."

Software Metrics will prove the validity of such remarks to large sections of our computer-using society. The effect will be startling — after all, it's the users who pay the bills.

DICK HALES

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Amsterdam: Rivierstraat, Amsterdam 1010. Telephone 461844 Telex 11338.



Puzzle answer

THE 15 moves are 2-4-A, 1-A, 5-C, 1-C, 2-B, 1-B, 3-C, 1-A, 2-C, 1-C, 4-B, 1-B, 2-A, 1-A, 3-B.